MS-I

AEROMETRICS

DEVICE FOR MEASURING THE TEMPERATURE OF LIQUID AND GASEOUS HYDROGEN

CONTRACT NAS8-11862

0700:1161

APRIL 1966

NASA - MARSHALL SPACE
FLIGHT CENTER
HUNTSVILLE, ALABAMA

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AEROJET-GENERAL CORPORATION

San Ramon, California

Final Report 0700:1161

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NASA - MARSHALL SPACE FLIGHT CENTER

Huntsville, Alabama

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Chief Engineer

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I. INTRODUCTION

This report is prepared to fulfill the requirements of Contract NAS8-11862, for the design, development and fabrication of a device to measure the temperature of liquid and gaseous hydrogen.

Contract NAS8-11682 provided for the development of a wide range ($-253^{\circ}C$ to $+60^{\circ}C$) temperature transducer for measurement of liquid and gaseous hydrogen. Three pre-production prototype transducers were fabricated, tested and delivered in February, 1966. Thirteen production transducers were fabricated, tested and delivered in March 1966.

Aerometrics' Proposal LR 651604 delineated the program which was followed to develop this wide range transducer.

The objective of the program was to develop a temperature sensor to meet the following requirements:

(1)	Range:	$-253^{\circ}C$ to $+60^{\circ}C$.
(2)	Pressure:	40 psia maximum.
(3)	Output:	5 vdc when amplified with a gain of 100.
(4)	Interchangeability:	$\pm$1% for range $-253^{\circ}C$ to $60^{\circ}C$.
(5)	Repeatability:	$\pm 0.1^{\circ}C$ ($-253^{\circ}C$ to $-190^{\circ}C$). $\pm 0.2^{\circ}C$ ($-190^{\circ}C$ to $+60^{\circ}C$).
(6)	Response:	Less than 100 milliseconds for 63.2% of the temperature change when the sensor is moved from under the surface of liquid hydrogen to a static hydrogen ullage at a temperature of $-190^{\circ}C$.

All details of this contract are reported including the test data.

II. SUMMARY AND CONCLUSIONS

This development program has resulted in producing a cryogenic temperature transducer which is extremely fast in response to changing temperatures, medium accuracy and measures temperature over a wide range.

The transducer will respond to a temperature change from -246°C to -196°C in 0.1 seconds (63% or 1 time constant). An accuracy of 0.3°C is typical over the -253°C to -190°C span when cycled between ambient and cryogenic temperatures repeatedly. The range of the transducer is designed for -253°C to 60°C.

The most unusual characteristic of the transducer is the shaped output curve. This curve is shaped to have a very high sensitivity in the liquid hydrogen range and low sensitivity over the remaining temperature span. Typical sensitivity at liquid hydrogen is 1.35 mv/°C. The output signal is also adequate for most recording systems, typically 20 mv at +60°C and 60 mv at -253°C.

III. DISCUSSION

A. PRINCIPLE OF OPERATION

The transducer and suggested electrical circuit are as shown in Figure 1. The output signal from the transducers is generated as a result of two transduction modes.

1. The voltage generated by passing a constant current through the temperature dependent resistor. Typical normalized resistance for a 100 ohm, ±5%, 1/8 watt Allen Bradley resistor is illustrated in Figures 2 and 3.

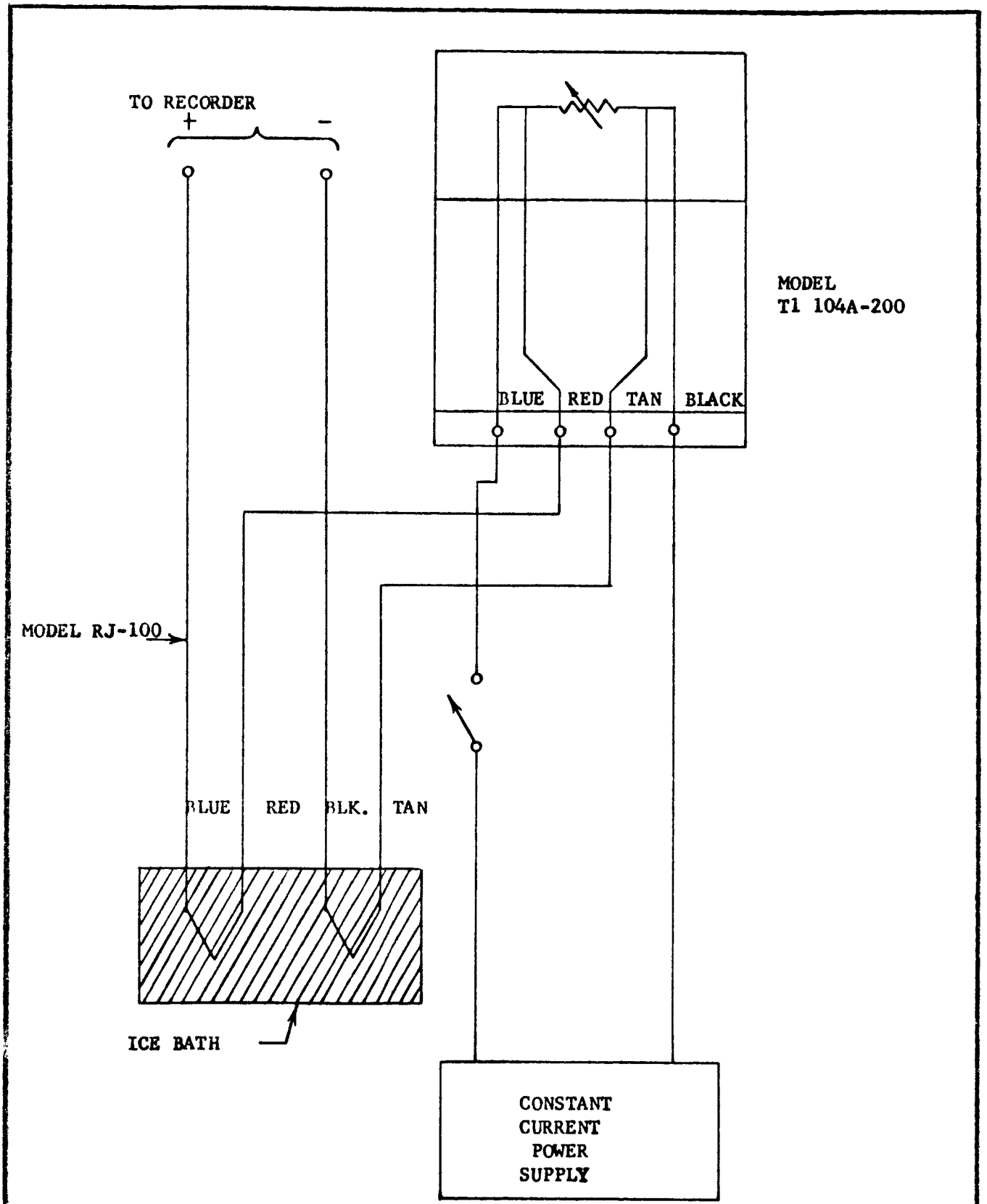
2. The voltage is generated by the thermocouple junction. The magnitude of this voltage is dependent upon the reference temperature and the temperature of the junction.

The two voltages are combined in the transducer to have a single output voltage which varies with temperature. Figures 4 and 5 illustrate the magnitude of these signals and the combined output curve for one of the delivered production transducers. For the -253°C to -190°C range, the transducer output varies exponentially with temperature and for the -190°C to +60°C range it is nearly linear. The exact output signal between -253°C and +60°C is a function of the constant current. All of the calibration data are based upon a 0.23 milliamp current which provides an average signal of 41.437 mv (no load) and 41.317 mv (with 100K load) for all 13 production transducers.

A summary of the output signal of the 13 production transducers is shown in Table 1.

SN	OUTPUT - MILLIVOLTS							
	60°C		0°C		-190°C		-253°C	
	No Load	100K Load	No Load	100K Load	No Load	100K Load	No Load	100K Load
2	18.703	18.675	22.453	22.438	35.907	35.855	60.083	59.928
4	19.735	19.703	23.112	23.092	36.882	36.826	62.269	61.836
5	18.413	18.389	22.344	22.324	35.475	35.422	59.292	59.160
6	19.075	19.067	22.620	22.606	36.102	36.045	60.488	60.340
9	18.830	18.801	22.380	22.352	36.024	35.966	60.076	59.934
10	18.871	18.813	22.294	22.266	35.885	35.832	60.547	60.455
11	18.595	18.570	21.935	21.909	35.387	35.341	59.282	59.141
12	18.882	18.661	22.380	22.350	35.963	35.918	59.950	59.806
19	18.730	18.709	22.280	22.253	35.860	35.807	59.705	59.566
22	19.162	19.139	22.717	22.689	36.771	36.716	61.364	61.210
23	18.756	18.727	22.665	22.635	36.372	36.337	60.646	60.497
24	19.000	18.971	22.533	22.507	36.166	36.113	60.602	60.460
25	19.103	19.075	22.799	22.759	35.921	35.866	60.228	60.085
Av.	18.912	18.869	22.501	22.475	36.055	36.003	60.349	60.186

Table 1



NOTE: Adjust the constant current power supply

FIGURE - 1 OPERATIONAL CIRCUIT

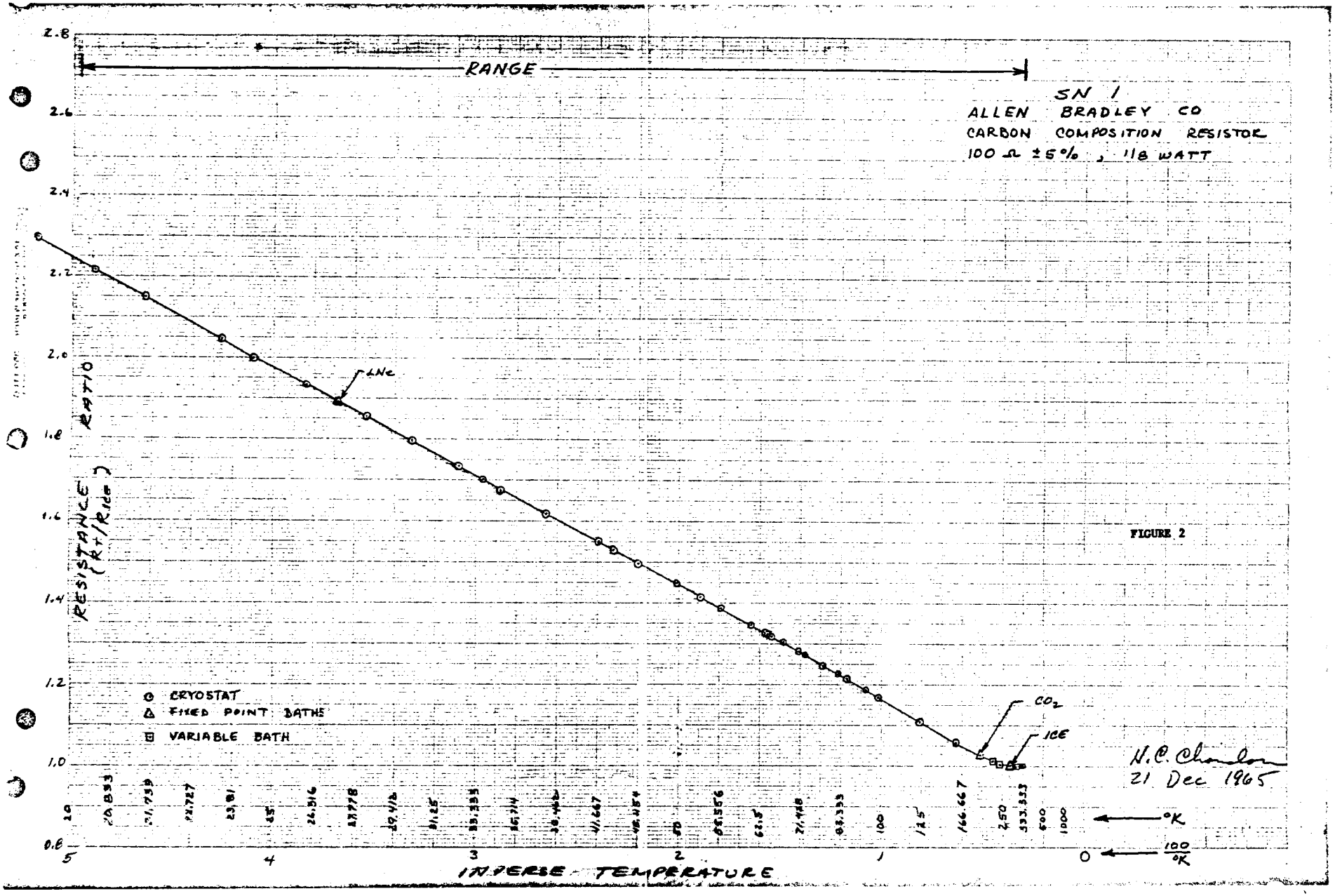
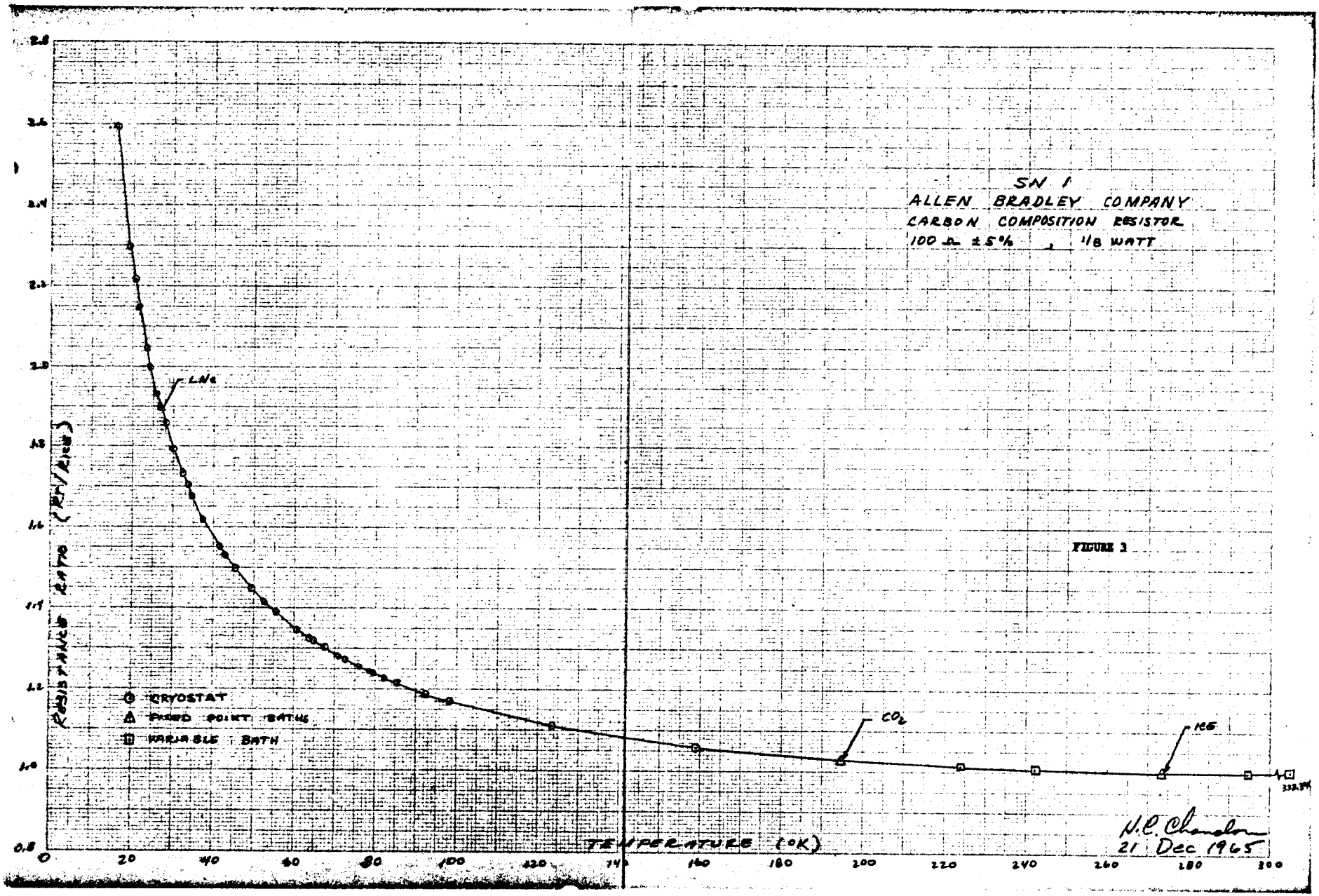

RANGE
SN 1
ALLEN BRADLEY CO
CARBON COMPOSITION RESISTOR
100 Ω ±5% , 1/8 WATT
RESISTANCE RATIO (Rt/R25°)
INVERSE TEMPERATURE
LNe
CO2
ICE
CRYOSTAT
FIXED POINT BATHS
VARIABLE BATH
°K
100/°K
N.C. Chambers
21 Dec 1965

FIGURE 2


SN 1
ALLEN BRADLEY COMPANY
CARBON COMPOSITION RESISTOR
100 Ω ±5% , 1/8 WATT
FIGURE 3
RESISTANCE RATIO (R/R273)
TEMPERATURE (°K)
LN2
CO2
ICE
CRYOSTAT
FIXED POINT BATHS
VARIABLE BATH
N.C. Chanaka
21 Dec 1965

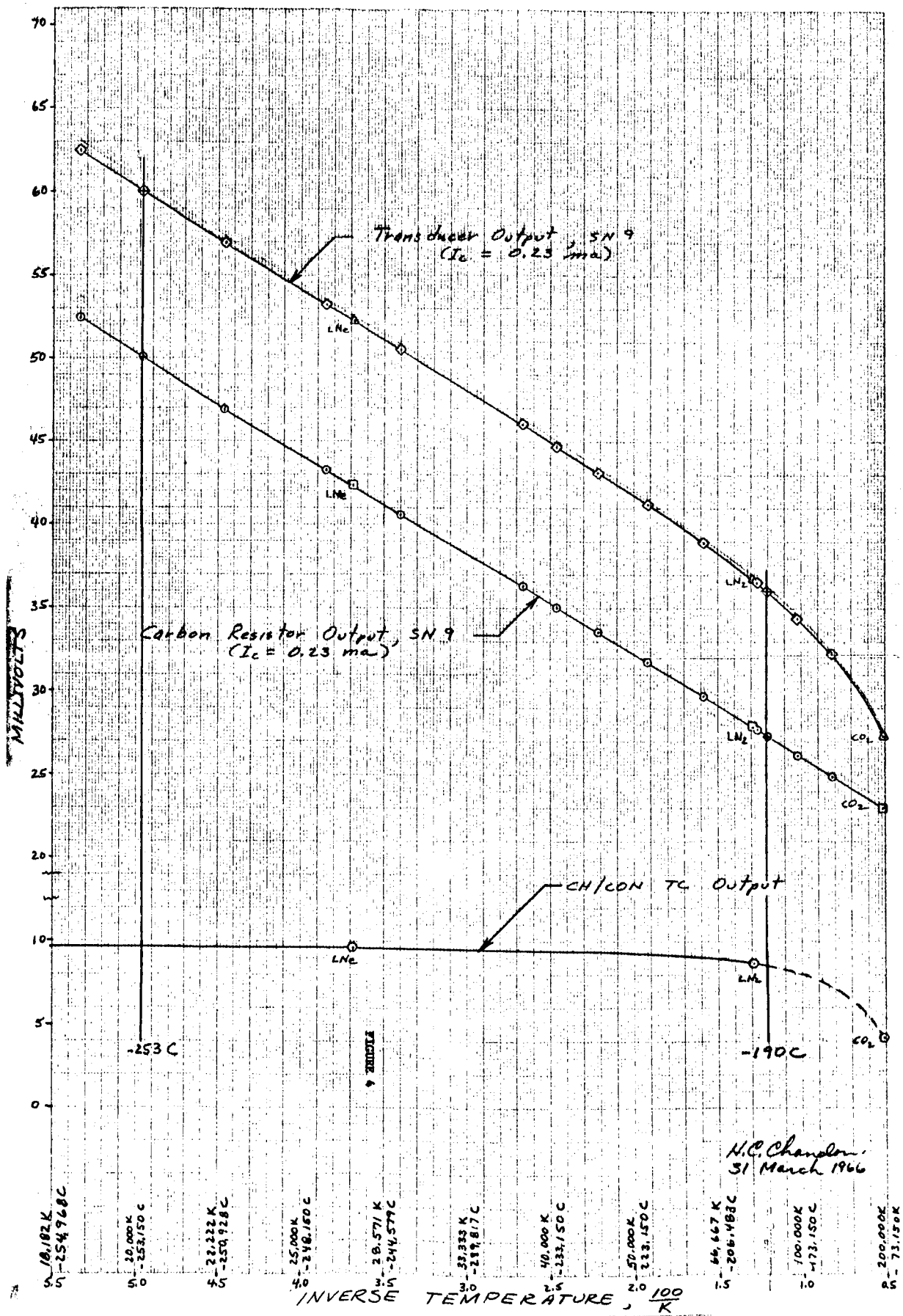
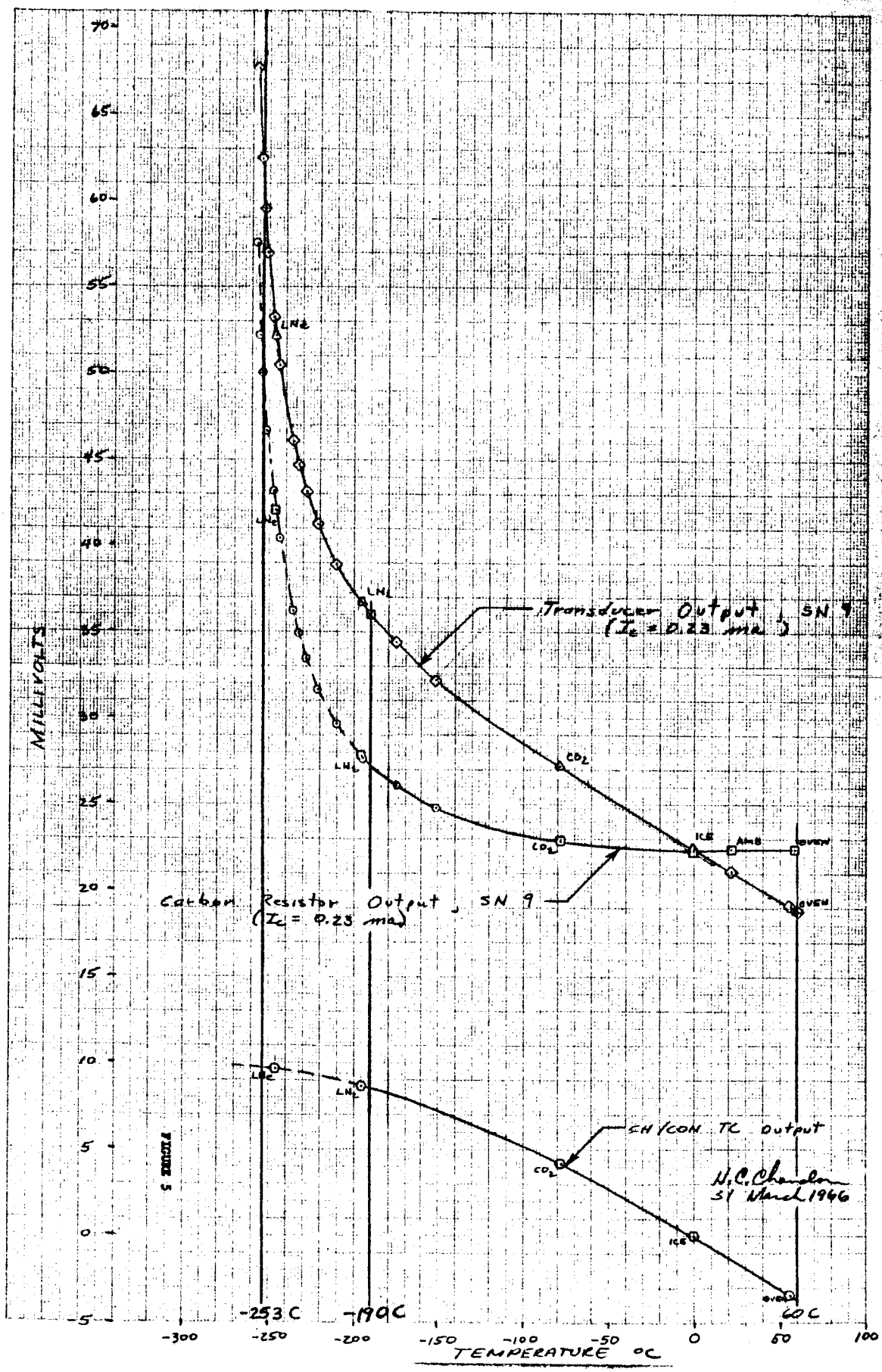


FIGURE 4

N.C. Chandon
31 March 1966



N. C. Chandon
31 March 1946

As shown, the output is lower than the desired 50 millivolts, for the full span. This is caused by selecting a value for the constant current supply lower than the value required to give a 50 millivolt signal.

The resultant output curve is therefore shaped to provide higher sensitivity at cryogenic temperatures and moderate sensitivity at ambient. Typical sensitivities for SN2 are:

0.132 mv/^{o}C (average over the -253^{o}C to +60^{o}C range).
1.35 mv/^{o}C at -253^{o}C.
1.12 mv/^{o}C at -246^{o}C. (LNE)
0.130 mv/^{o}C at -190^{o}C.
0.0556 mv/^{o}C at -78^{o}C.
0.00927 mv/^{o}C at 60^{o}C.

B. DEVELOPMENTAL PHASE

During the developmental phase of the contract, the following listed items were investigated.

(1) Element selection.
(2) Element sealing.
(3) Transducer design.
(4) Calibration methods.
(5) Response test evaluation.

A brief review of each of these phases follows:

1. Element Selection.

Initial testing for stability of carbon resistors from the following companies was achieved during the developmental phase of the program.

MANUFACTURER	MODEL	ASSIGNED SERIAL NUMBER	ELEMENT TYPE
Allen-Bradley	TR	2 thru 9	100 ohm ±10%, 1/10 watt carbon composition
Allen-Bradley	EB	1 and 2	91 ohm, ±5%, 1/2 watt carbon composition
Allen-Bradley	GB	1 and 2	120 ohm, ±5%, 1 watt carbon composition

MANUFACTURER	MODEL	ASSIGNED SERIAL NUMBER	ELEMENT TYPE
Aerovox	RN 20X 60 ROF CPSX-1/2	1 and 2	60 ohm $\pm$1%, 1/2 watt
Aerovox	RN 20X 3300%	1	330 ohm, metal film
Speer		1	100 ohm $\pm$ 20%, watt carbon composition

These tests were conducted on randomly selected resistors from the Engineering Laboratory developmental supply.

Allen-Bradley resistors exhibited stability problems at the ice point when cycled between the ice point and liquid nitrogen. Repeated tests did not show a tendency of this shift to decrease in slope or to stabilize. The Aerovox resistors were stable at the ice point, however, they exhibit a very small change in resistance with corresponding change in temperature. For example, the resistance change for the Aerovox units was only 5.5% between ice and LN_2 as compared with 27% for the Allen Bradley resistors. Testing of the less sensitive Aerovox resistors was discontinued in favor of the Allen-Bradley resistors.

2. Element Sealing

During the development of a cryogenic to ambient temperature measuring device, it became necessary to find a carbon resistor of the Allen Bradley 1/8 watt variety which evidenced a stable resistance value at the ice point when cycled between the ice point and liquid helium temperatures. All resistors tested showed a random drift pattern which seemed to indicate moisture absorption. To stabilize this resistor to an ice point resistance accuracy of 0.01%, the following state-of-the-art modification was performed on the resistor.

First, remove all paint and varnish from the resistor to be modified. This may be accomplished by scraping with a sharp tool. Next, apply General Electric Co. Glyptol #7031 resin as thin as possible to the resistor, being careful to cover completely. The resistor is then placed in an atmosphere oven and cured at 50 psig pressure for two (2) hours at ambient temperature ($72^{\circ}F \pm 5^{\circ}F$). The resistor is then dried at $100^{\circ}F$ for a minimum of 24 hours. If the resistor is then mounted in its

permanent configuration, it will exhibit a stability of $\pm$0.01% at the ice point when cycled between the ice point and cryogenic temperatures.

The 100 ohm $\pm$5% 1/8 watt Allen Bradley resistors have demonstrated the best repeatability at ice point, typically 0.01%, when cycled between LN_2 and ambient.

3. Transducer Design

a. The transducer can be used as a totally immersed type, or for external use with the sensor protruding into the liquid through a boss. When used totally immersed, a jam nut is provided to allow mounting to a flat plate. For use through a boss, the jam nut is removed and an "O" ring installed for sealing.

b. The transducer housing, jam nut, stem and insert are made from type 321 stainless steel. (Figure 6)

c. A special teflon insulated four conductor cable is required for the transducer. The cable is composed of four conductors each of which is made up of five (5) strands of #26 AWG wire to form a #19 AWG conductor. There are two copper conductors, which provide excitation current to the resistor, one chromel thermocouple conductor and one constantan thermocouple conductor. Each conductor is reduced to one #26 AWG wire to allow direct mounting of the resistor to the wires in the stem of the transducer. Figure 7.

d. The element is a sealed and calibrated 1/8 watt Allen Bradley carbon resistor mounted to provide a fast response in hydrogen. Figure 8.

e. The lead wires are secured in the housing by a cryogenically compatible potting compound. (Figure 9)

f. To allow hydrogen flow around the element, the stem is perforated in a pattern which allows easy exit of generated gases and causing a pumping action on the liquid. This stem is required to provide mechanical protection for the element, and as a coupling means for attachment of the transfer tube used for response testing. (Figures 10 and 11)

4. Calibration Methods

Methods had to be developed for calibrating the resistors and completed transducers. They are briefly as follows:

(a) The element must always be protected against direct immersion in water. It was found that direct immersion in water induces thermal EMFS in the circuit which are both large (typically 50 to 100 microvolts) and unstable. This EMF was eliminated by inserting pyrex tubes partially filled with ethanol in the ice baths.

(b) A pyrex tube was also used for element calibrations at CO_2 temperatures, these tubes were placed in the CO_2 test setup and allowed to stabilize before each calibration.

(c) Group calibration of resistor elements when made on 5 elements grouped together per Figure 12. These resistors were then placed inside of the helium-cooled cryostol for multipoint calibration.

5. Response Testing

Experimentation was conducted to define response characteristics for both the element and completed transducers. This data is reported in Section C. The final method selected for testing of the production transducer obtaining temperature step from -190°C to -253°C is as follows:

(a) -190°C to -253°C pre-cool the unit in LN_2 and quickly dunk it in LNe. The corresponding temperatures are -196°C and -246°C.

(b) -253°C to -190°C remove the liquid from around the element. This is accomplished by placing the element inside a tygon tube and blowing the LNe from around the element with GHe. Figures 13 and 14 illustrate the test method.

C. PRE-PRODUCTION PROTOTYPE TRANSDUCERS

1. Introduction

Five pre-production prototype transducers were fabricated and completed. Of these, three were selected for delivery to NASA to fulfill contractual requirements. These units were fabricated in accordane with the production transducer drawings, see Section III-D, except for the following items:

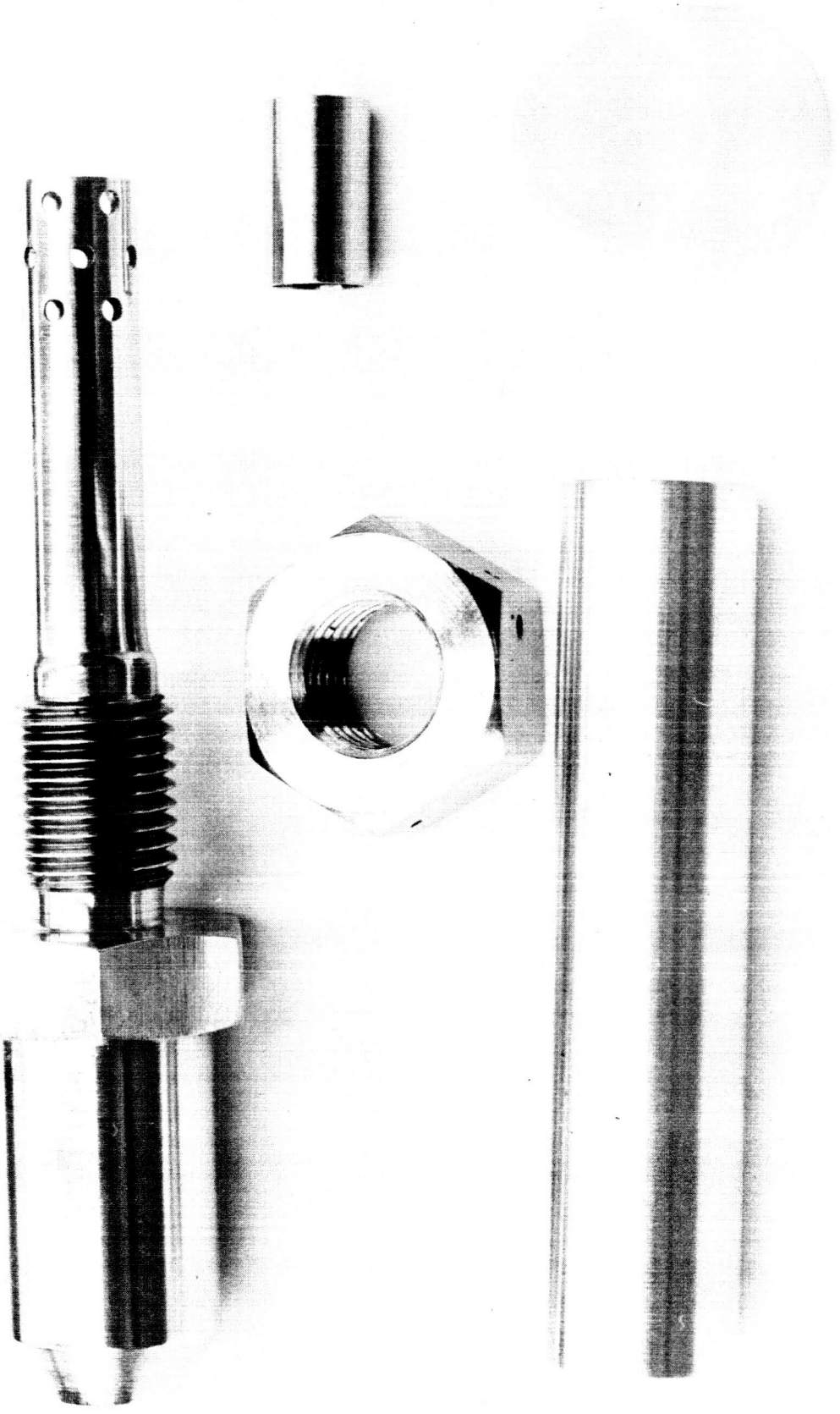


FIGURE 6 - MODEL TI-104A-200 COMPONENT PARTS

FIGURE 7 - MODEL TI-104A-200 LEADWIRES WITH MOUNTED ELEMENT

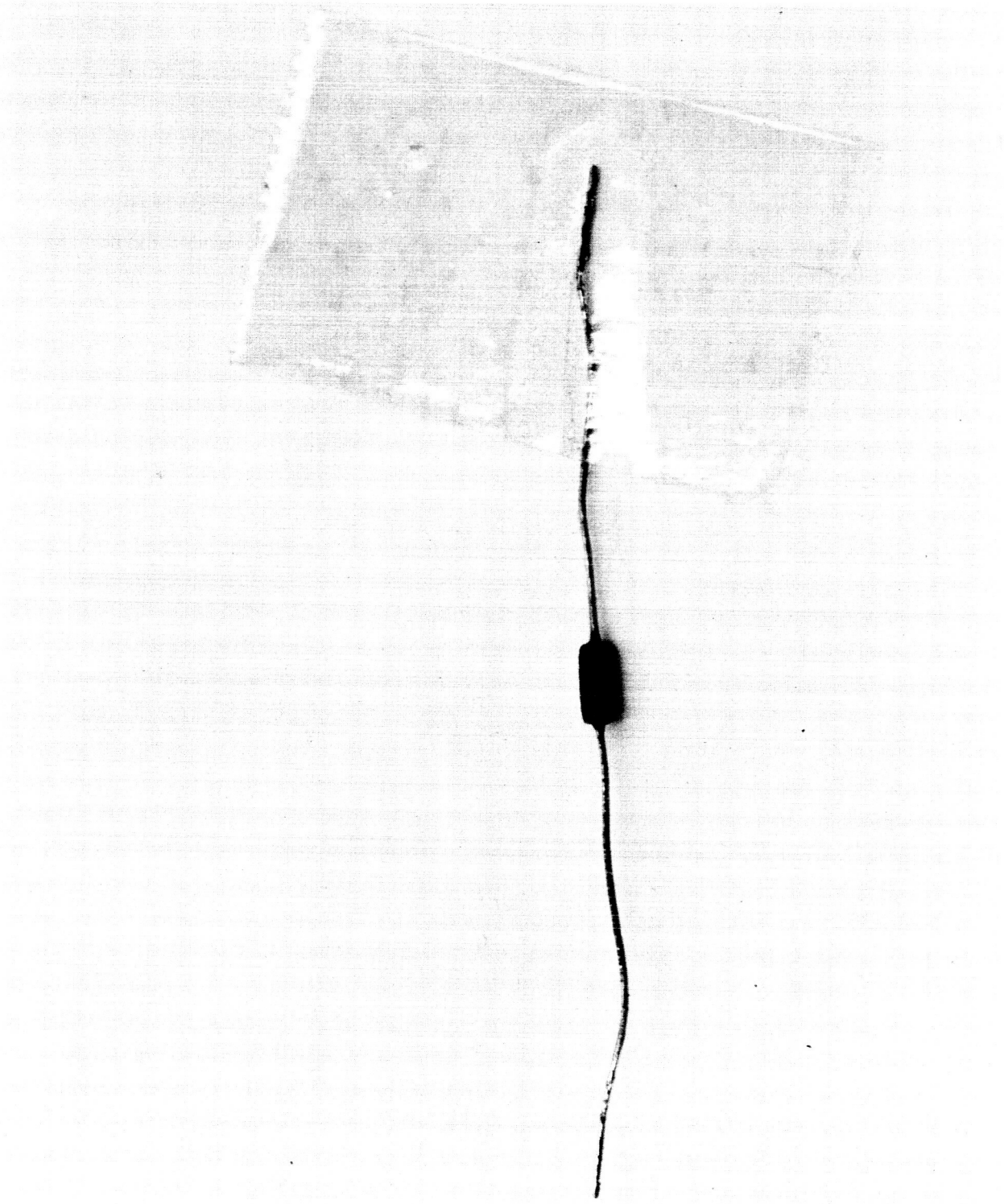


FIGURE 8 - MODEL TI-104A-200 ELEMENT

FIGURE 9 - MODEL TI-104A-200 INSERT ASSEMBLY

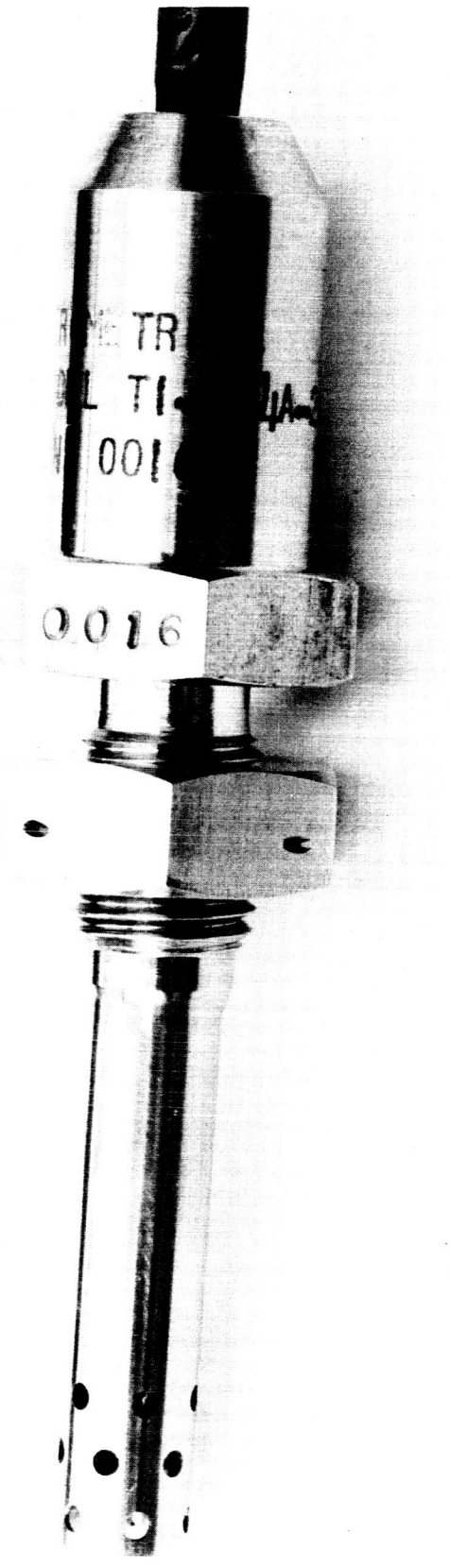


FIGURE 10 - MODEL TI-104A-200 TRANSDUCER

FIGURE 11 - MODEL TI-104A-200 TRANSDUCER

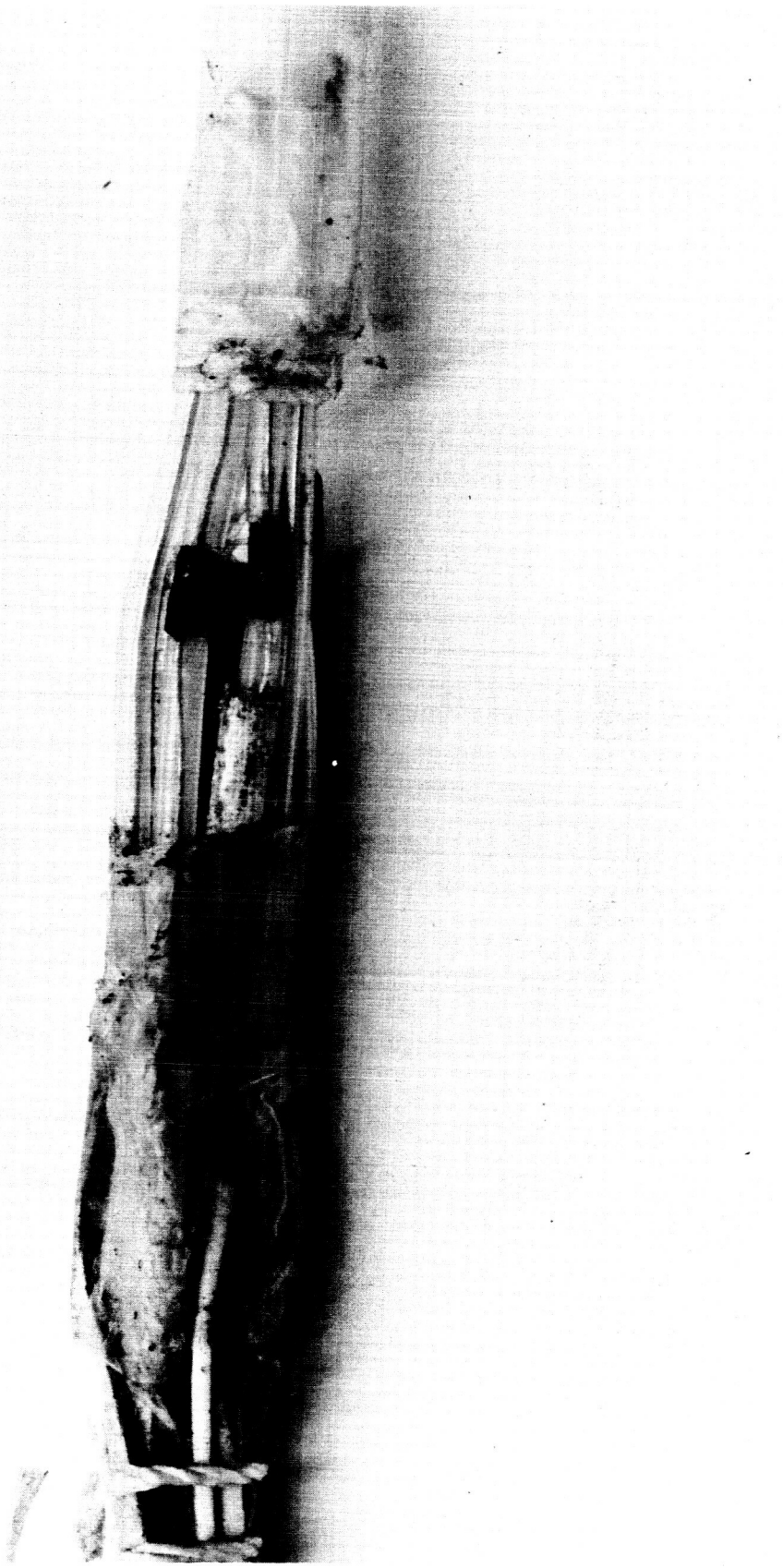


FIGURE 12 - FIVE ELEMENTS GROUPED TOGETHER WITH A STANDARD FOR MULTIPOINT CALIBRATION

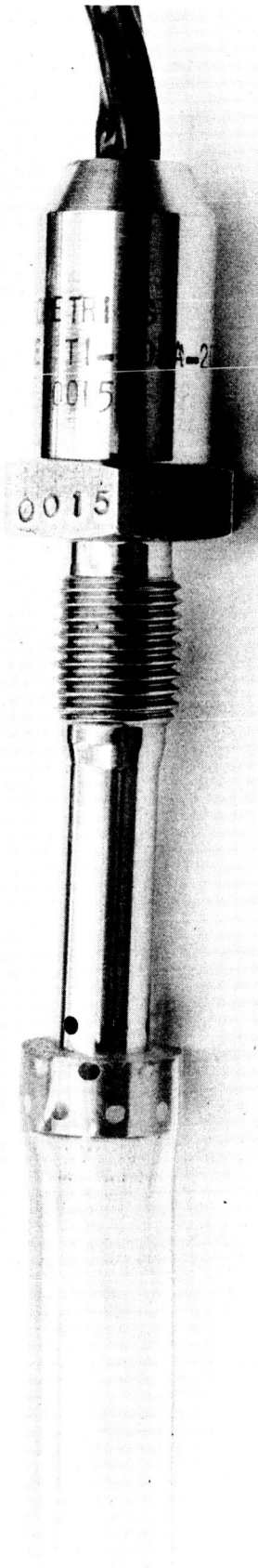


FIGURE 13 - MODEL TI-104A-200 PREPARED FOR RESPONSE TESTING IN LNe

FIGURE 14 - MODEL TI-104A-200 ELEMENT PREPARED FOR RESPONSE TESTING

(a) The element location at the tip varied slightly between the 5 pre-production prototype transducers.

(b) Two of the five transducers were fabricated with polished surfaces and the balance have vapor honed surfaces. The polished surface was selected for the final units.

(c) The elements were only calibrated in fixed point baths at 5 temperatures (ICE, CO_2, LN_2, LNe, and LHe) as compared with 10 temperatures for the production units.

2. Element Testing

Each of the resistors was tested to assure a stable ice point resistance by cycling from ambient to LN_2 for at least 10 cycles, and calibrated at five temperatures in fixed point baths. This data is reported in Enclosure 1. The greatest shift in resistance was 0.041 ohms or 0.041 percent which is acceptable per drawing 1126039.

One of the elements, SN17, was response tested prior to fabrication into a completed transducer. Several experiments were conducted to acquire different characteristics of the element. Of primary interest is the response from LNe to GHe which corresponds to a step between LH_2 and GH_2. This data averaged 0.06 sec. (1TC) for 4 cycles.

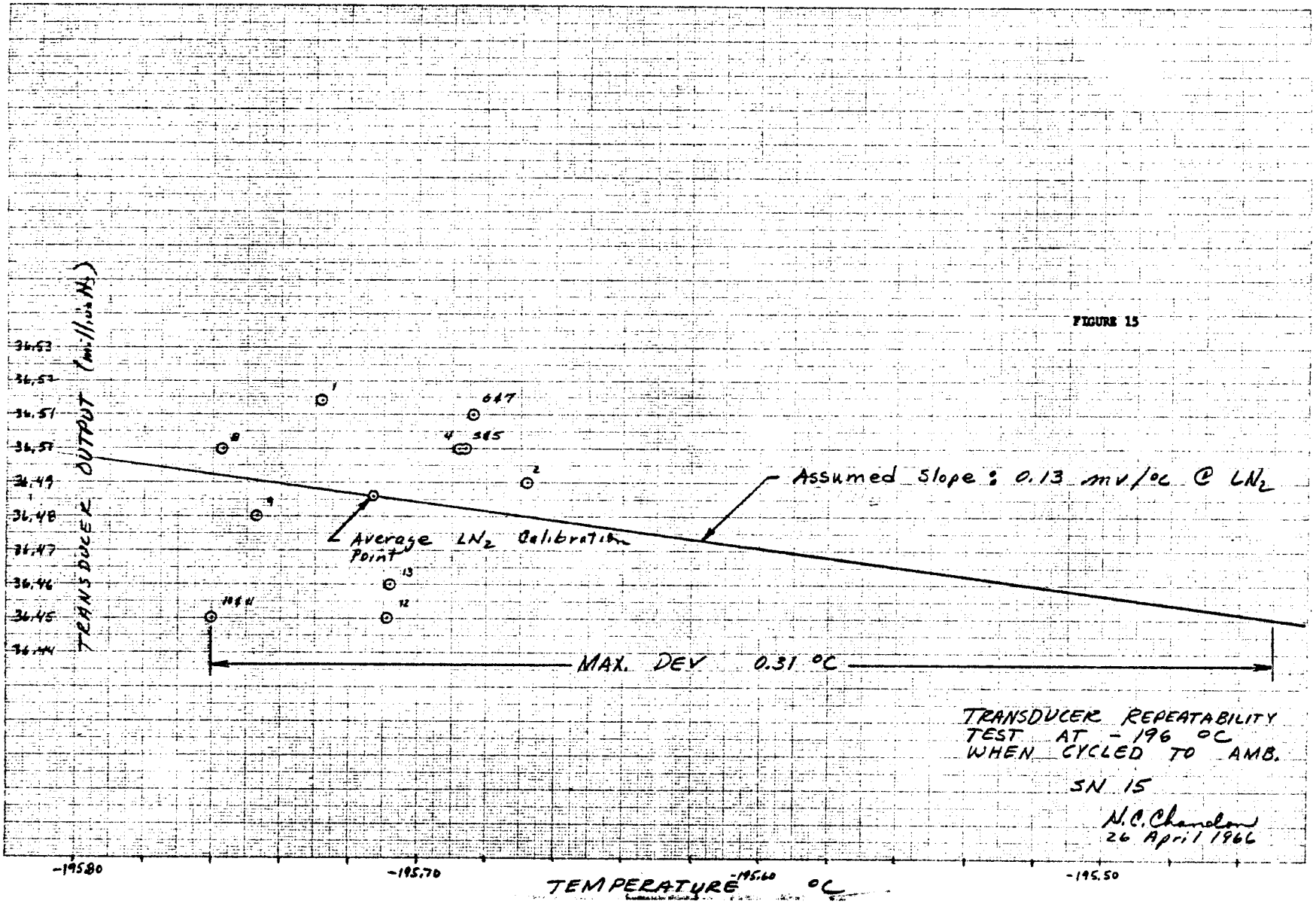
3. Transducer Testing

Each of the 5 pre-production prototype transducers was calibrated at four temperatures (ICE, ambient, LN_2 and LNe). The output measurements were taken using a constant current of 0.23 ma through the element. This data is recorded in Enclosure 2. This calibration data is insufficient to form a data reduction for the entire measurement range. Complete data reduction values will have to be calculated using the individual calibration data and the general curve shape from a typical curve for the production units.

Response measurements were made on each of these transducers. The data is reported in Enclosure 2. This data must be correlated with the liquid hydrogen test data for establishing an alternate simple and cheap method of response testing.

Two of the transducers, SN 15 and 16, were cycled between ambient temperature and -246°C twelve times to evaluate the repeatability of the transducers. During each cycle, each transducer was calibrated at ambient, ICE, LN_2 and LNe temperatures. Graphical analysis, Figures 15 through 18, indicated the transducers to be repeatable 0.32°C at -246°C and 0.17°C at -196°C maximum. The assumed slope is the average value measured on the 13 production transducers. All the data are recorded in Enclosure 2.

FIGURE 15



TRANSDUCER REPEATABILITY
TEST AT -196 °C
WHEN CYCLED TO AMB.

SN 15

N.C. Chandler
26 April 1966

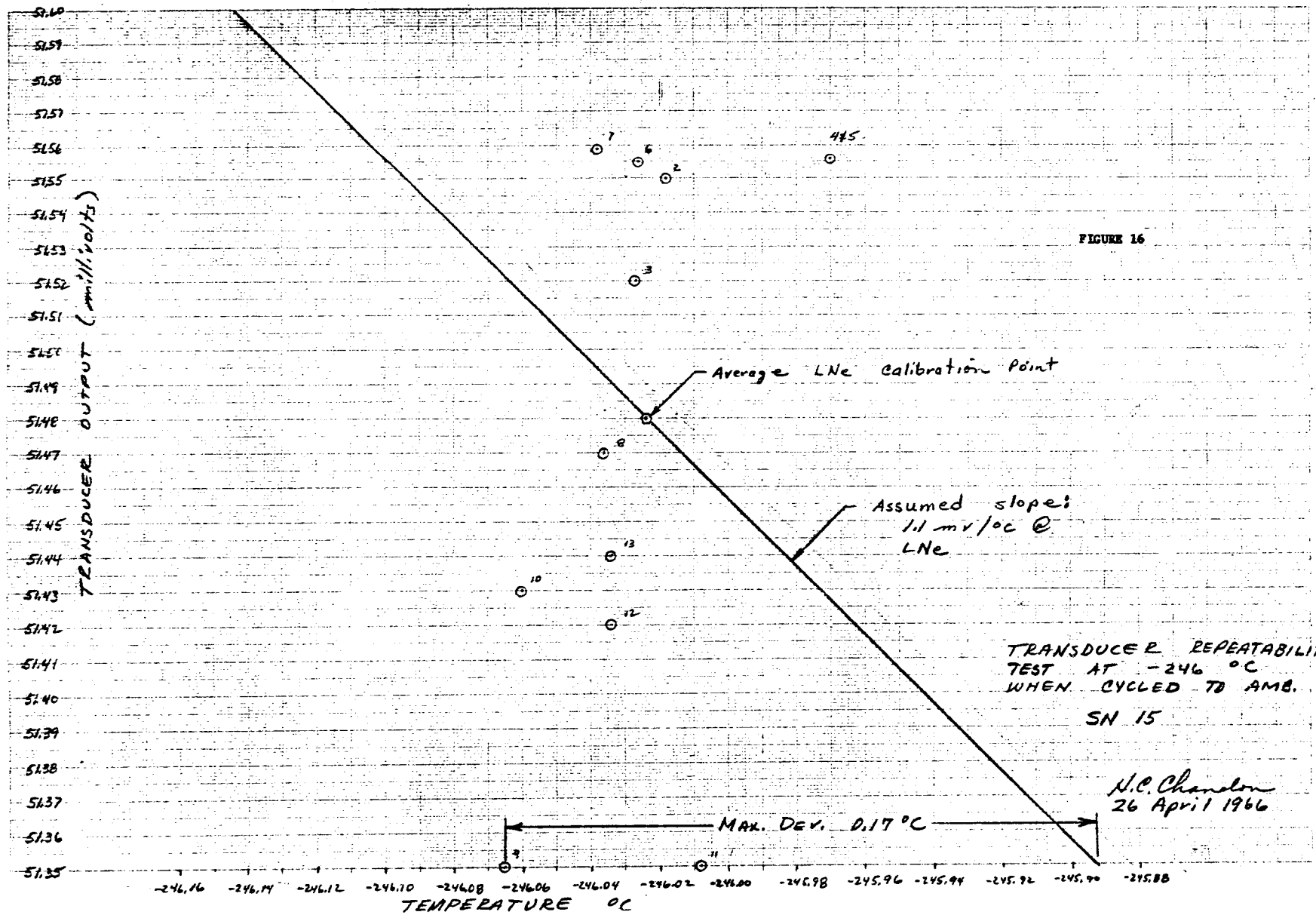
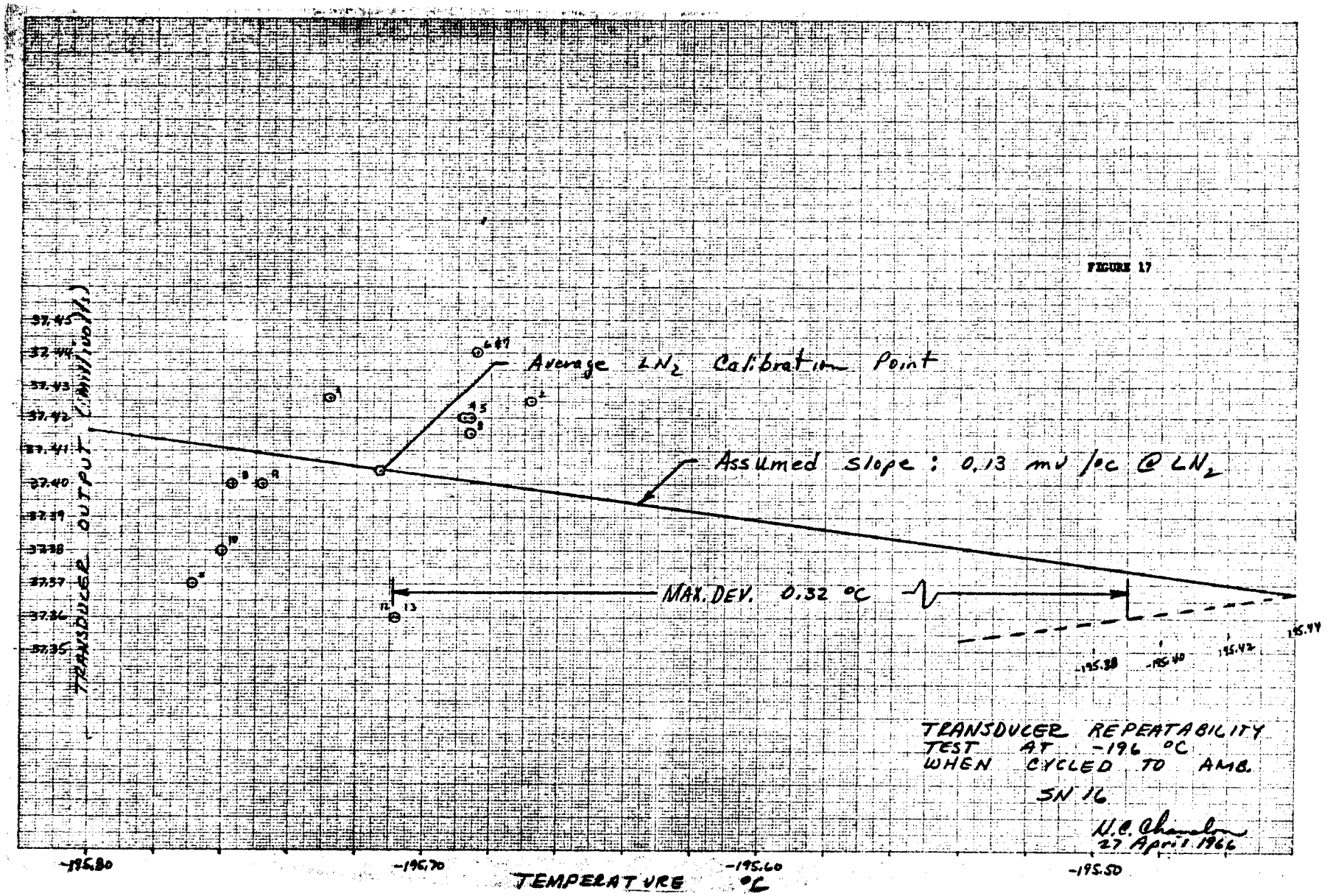

TRANSDUCER OUTPUT (millivolts)
51.60
51.59
51.58
51.57
51.56
51.55
51.54
51.53
51.52
51.51
51.50
51.49
51.48
51.47
51.46
51.45
51.44
51.43
51.42
51.41
51.40
51.39
51.38
51.37
51.36
51.35
-246.16
-246.14
-246.12
-246.10
-246.08
-246.06
-246.04
-246.02
-246.00
-245.98
-245.96
-245.94
-245.92
-245.90
-245.88
TEMPERATURE °C
Average LNe Calibration Point
Assumed slope: 1.1 mv/°C @ LNe
MAX. DEV. 0.17 °C
TRANSDUCER REPEATABILITY TEST AT -246 °C WHEN CYCLED TO AMB.
SN 15
N.C. Chanelon
26 April 1966

FIGURE 16

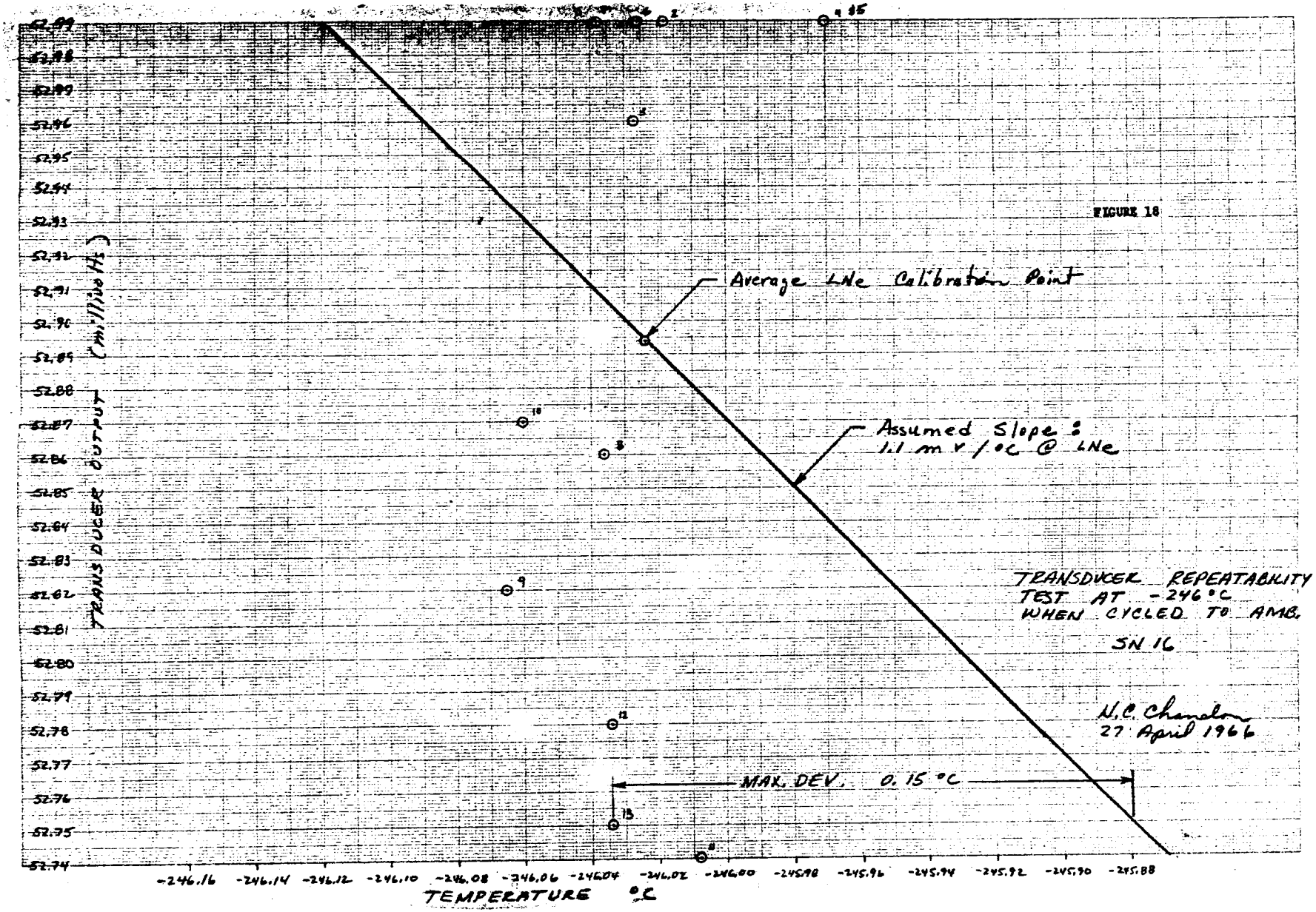
FIGURE 17



TRANSDUCER REPEATABILITY
TEST AT -196 °C
WHEN CYCLED TO AMB.
SN 16

N.C. Chamberlain
27 April 1966

FIGURE 18


Average LNe Calibration Point
Assumed Slope:
1.1 mv/°C @ LNe
TRANSDUCER REPEATABILITY
TEST AT -246 °C
WHEN CYCLED TO AMB.
SN 16
N.C. Chandler
27 April 1966
MAX. DEV. 0.15 °C
TRANSDUCER OUTPUT (mv/11.36 Hz)
TEMPERATURE °C
52.99
52.98
52.97
52.96
52.95
52.94
52.93
52.92
52.91
52.90
52.89
52.88
52.87
52.86
52.85
52.84
52.83
52.82
52.81
52.80
52.79
52.78
52.77
52.76
52.75
52.74
-246.16
-246.14
-246.12
-246.10
-246.08
-246.06
-246.04
-246.02
-246.00
-245.98
-245.96
-245.94
-245.92
-245.90
-245.88

D. PRODUCTION TRANSDUCERS

1. Introduction

A total of 13 transducers were fabricated and delivered to NASA. These transducers were fabricated in accordance with the following drawings, **see Enclosure 3.**

a. 1126041 - Transducer, R/TC Temperature, Model TI-140A-200

b. 1126040 - Insert, Thermocouple, Sub-Assembly, R/TC Temperature Transducer, Model TI-104A

c. 1125449 - Nut, Drilled Jam

d. 1126038 - Body, R/TC Temperature Transducer, Model TI-104A

e. 1126037 - Stem and Insert, R/TC Temperature Transducer, Model TI-104A-200

f. 1124976 - Tube, Protection

g. 1126039 - Element, Resistor, R/TC Temperature Transducer, Model TI-104

2. Description

a. The transducer can be used as a totally immersed type, or for external use with the sensor protruding into the liquid through a boss. When used totally immersed, a jam nut is provided to allow mounting to a flat plate. For use through a boss, the jam nut is removed and an "O" ring installed for sealing.

b. The transducer housing, jam nut, stem and insert are made from type 321 stainless steel. (Figure 6)

c. A special teflon insulated four conductor cable is required for the transducer. The cable is composed of four conductors each of which is made up of five (5) strands of #26 AWG wire to form a #19 AWG conductor. There are two copper conductors, which provide excitation current to the resistor, one chromel thermocouple conductor and one constantan thermocouple conductor. Each conductor is reduced to one #26 AWG wire to allow direct mounting of the resistor to the wires in the stem of the transducer. (Figure 7)

d. The element is a sealed and calibrated 1/8 watt Allen Bradley carbon resistor mounted to provide a fast response in hydrogen. (Figure 8)

e. The lead wires are secured in the housing by a cryogenically compatible potting compound. (Figure 9)

f. To allow hydrogen flow around the element, the stem is perforated in a pattern which allows easy exit of generated gases and causing a pumping action on the liquid. This stem is required to provide mechanical protection for the element, and as a coupling means for attachment of the transfer tube used for response testing. **(Figures 10 and 11)**

3. Element Testing

Elements were prepared as detailed on drawing 1126039. Each element was scraped clean and then moisture sealed before any electrical testing was performed. All test data for the elements is attached as **Enclosures 4 and 5.**

Briefly, each element was tested first for repeatability before any calibrations were attempted. By this procedure, all elements which failed to meet the repeatability test, indicating a poor moisture seal or other impairment, were discarded as not acceptable as transducer elements. The repeatability was determined by measuring the ice point resistance for each of ten (10) cycles to liquid nitrogen.

The acceptable elements were then calibrated at several points within the normal operating range. Five elements were grouped together with a platinum resistance standard for this calibration. The temperatures were supplied by fixed point baths, the liquid helium controllable cryostat, and a hot air furnace as noted on the data sheets. The resistance of the element was measured using a four wire circuit with an excitation current of 0.25 milliamperes.

4. Acceptance Testing

Each production transducer (Figure 1) was tested in accordance with the Aerojet Test Procedure ATP-7905-007 (Enclosure 6). The data sheets generated during this testing are found as Enclosure 7.

The procedure calls for a final transducer calibration at five temperatures. The elements used in the transducer were previously calibrated, but since the element was mounted in the transducer after this calibration, and since the element is soldered to the lead wires during assembly, it is necessary to final calibrate to detect any shifts. The soldering of the lead wires to the resistor is a critical phase of the transducer fabrication since the joint thus formed is only 0.05 inches from the carbon composition resistor. The data generated by the five calibration points is sufficient to allow curve adjustment of the final transducer to meet the specified temperature accuracy required.

Response testing of each transducer was conducted using liquid neon (-246°C) or liquid nitrogen (-197°C) as the cryogenic medium. The response time was measured for changes in temperature from -246°C to -196°C and from -196°C to -246°C by either plunging the transducer from LN_2 to LNe, or immersing the sensor in LNe and blowing the LNe from around the element with gas conditioned to LN_2 temperature (Figure 13). Response data is shown in Enclosure 7.

5. Thermocouple Tables

With no excitation current to the transducer, each transducer output was measured during the acceptance testing. This data was used to develop a special EMF vs temperature table for the chromel constantan wire. Since the wire is from one spool, the average values are used to develop the most accurate set of tables. This temperature table is shown in Enclosure 8.

6. Calibration Data Sheets

A calibration data sheet for each transducer has been prepared. This data specifies the transducer output when using a constant current excitation of 0.23 ma for both no load and a 100K ohm load. Columns (2), (3), (10) and (16) provide the required data for using the developed transducer for temperature measurements. For greatest data reduction accuracy, the data should be programmed for reduction by a computer. For temperatures in the -253°C to -190°C range, data should be reduced using column (3) or logarithmic interpolation. For temperatues in the -190°C to +60°C range, data should be reduced using column (2) or linear interpolation.

Correction curves necessary to adjust for element resistance changes are enclosed. These values compensate for the element shift during assembly into the transducer presumably caused by soldering. See Enclosure 10.

E. TOOLING

A reference junction and ice bath were fabricated to aid in the checkout and operation of the transducers. Both of these parts were delivered with the production transducers.

The ice bath is a modified commercial 2 quart vacuum bottle. The cup was modified to seal the containing area and retain the reference thermocouple. When properly prepared, the bath will hold a stable temperature for 48 hours in a laboratory.

The reference junction is an immersion type designed to be used with the ice bath to provide a stable reference voltage for the transducers. Cable for the reference junction is from the same spool of wire as the transducers thus minimizing the splice junction errors.

These components are illustrated in Figures 19, 20 and 21. Fabrication drawings are attached as Enclosure 11.

FIGURE 19 - ICE BATH AND MODEL RJ-100 REFERENCE JUNCTION THERMOCOUPLE

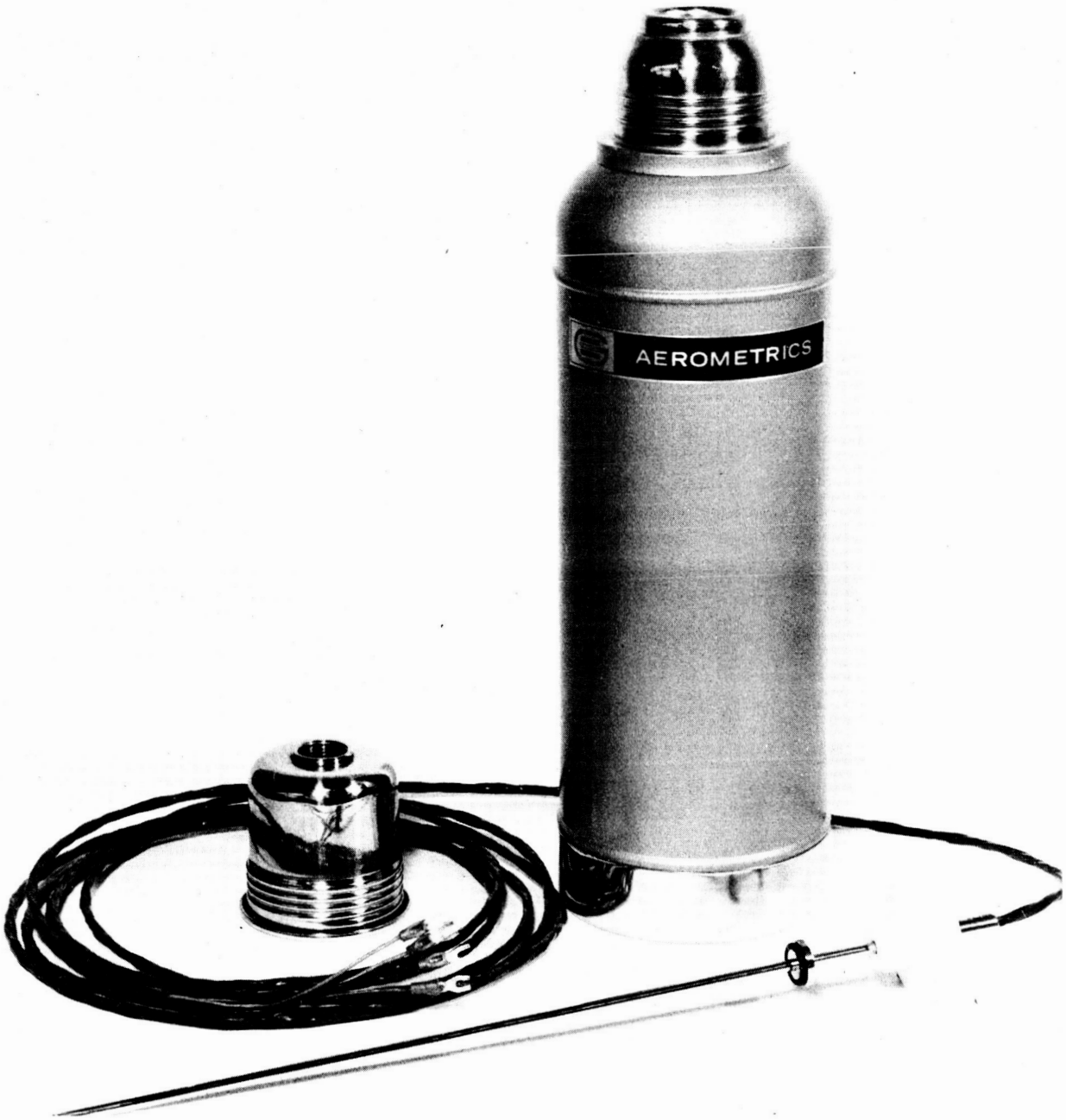


FIGURE 20 - ICE BATH AND MODEL RJ-100 REFERENCE JUNCTION THERMOCOUPLE

FIGURE 21 - MODEL RJ-100 REFERENCE JUNCTION THERMOCOUPLE

Enclosure 1
0700:1161

ELEMENT TEST DATA FOR

PRE-PRODUCTION PROTOTYPE TRANSDUCERS

CALIBRATION DATA SHEET ICE TO LN2 REPEATABICITY

ASC 3-026-006

DATE NOV 11 1965

MANUFACTURER	MODEL NO.	SERIAL NO.	PROCEDURE NO.	TECHNICIAN
ALP	100Ω ±5% 1/8W	13		R

MAINTENANCE RECORD

CALIBRATION EQUIPMENT

MANUFACTURER	SERIAL NO.	SERIAL NO.	RECALL DATE	MANUFACTURER	SERIAL NO.	SERIAL NO.	RECALL DATE

MODIFICATION RECORD

CALIBRATION DATA

PROC. STEP NO. (1)	FUNCTION TESTED NOV 11 1965 (2)	READING OR VALUE NOMINAL (3)	READING OR VALUE MEASURED (4)	CORRECTED VALUE OF COLUMN ____ (5)	✓ CHECK ONE: DEVIATION / CORRECTION / ERROR / ACTUAL VALUE (6)	CALIBRATION TOLERANCES LOWER LIMIT (7)	CALIBRATION TOLERANCES UPPER LIMIT (8)
	TEST CYCLES	N	R	AVER			
	1	98.181	98.201	98.191 Ω			
	2	98.198	98.215	98.207			
	3	98.213	98.235	98.224			
	4	98.215	98.231	98.223			
	5	98.216	98.237	98.227			
	6	98.211	98.228	98.220			
	7	98.216	98.238	98.227			
	8	98.225	98.239	98.232Ω			
	9	98.223	98.239	98.231			
	10	98.225	98.237Ω	98.231Ω			
					10 PT AVER 98.221Ω		
					0.091 DEVIATION		

(CONTINUED ON REVERSE SIDE)

CALIBRATION DATA SHEET

ICE TO LN2 REPEATABILITY

AGC 8-028-006

DATE NOV 15 1965

MANUFACTURER	MODEL NO.	SERIAL NO.	PROCEDURE NO.	TECHNICIAN
ACP	100Ω ±5% 1/8W	14		R

CALIBRATION EQUIPMENT

MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE	MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE

CALIBRATION DATA

PROC STEP NO. (1)	FUNCTION TESTED (2)	READING OR VALUE NOMINAL (3)	READING OR VALUE MEASURED (4)	CORRECTED VALUE OF COLUMN ____ (5)	✓ CHECK ONE: DEVIATION / CORRECTION / ERROR / ACTUAL VALUE (6)	CALIBRATION TOLERANCES LOWER LIMIT (7)	CALIBRATION TOLERANCES UPPER LIMIT (8)
	Test Runs	N	R				
	NOV 11 1965 1	96.874	96.892	96.883			
	2	96.890	96.908	96.899			
	3	96.897	96.913	96.905			
	NOV 12 1965 4	96.892	96.910	96.901			
	5	96.899	96.915	96.907			
	6	96.895	96.912	96.904			
	7	96.902	96.916	96.909			
	8	96 897	96.912	96.905	8 PT AVG 96.901Ω ambient temp over week end		
	NOV 15 1965 1	96.858	96.867	96.858			
	2	96.881	96.899	96.890			
	3	96.883	96.901	96.892			
	9	96.880	96.900	96.890			
	5	96.882	96.900	96.891			
	6	96.883	96.903	96.893			
	7	96.882	96.901	96.892			
	8	96.886	96.906	96.896			
	9	96.883	96.903	96.893			
	10	96.882	96.902	96.892Ω	10 PT AVG 96.889Ω 0.038 Deviation		

(CONTINUED ON REVERSE SIDE)

CALIBRATION DATA SHEET

ICE TO LN_2 REPEATABILITY

AGC 3-026-006

DATE NOV 16 1965

MANUFACTURER	MODEL NO	SERIAL NO	PROCEDURE NO.	TECHNICIAN
ALP	100Ω ±5% 1/8W	15		R

MAINTENANCE

CALIBRATION EQUIPMENT

FUNCTION	MODEL NO.	SERIAL NO.	RECALL DATE	MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE

MODEL NO

CALIBRATION DATA

PROC STEP NO. (1)	FUNCTION TESTED (2) NOV 16 1965	READING OR VALUE NOMINAL (3)	READING OR VALUE MEASURED (4)	CORRECTED VALUE OF COLUMN ____ (5)	✓ CHECK ONE: DEVIATION / CORRECTION / ERROR / ACTUAL VALUE (6)	CALIBRATION TOLERANCES LOWER LIMIT (7)	CALIBRATION TOLERANCES UPPER LIMIT (8)
	Test Points	N	R				
	1	97.236Ω	97.256Ω	97.246Ω			
	2	97.227	97.248	97.238			
	3	97.223	97.242	97.233			
	4	97.225	97.245	97.235			
	5	97.210	97.230	97.220			
	6	97.208	97.228	97.218			
	7	97.209	97.229	97.219			
	8	97.214	97.231	97.222			
	9	97.218	97.239	97.229			
	10	97.215Ω	97.232Ω	97.224Ω			

10 PT AVER 97.228

0.028Ω DEVIATION

(CONTINUED ON REVERSE SIDE)

CALIBRATION DATA SHEET

ICE TO LN_2 REPEATABILITY

AGC 3-028-005

DATE NOV 18 1965

MANUFACTURER	MODEL NO	SERIAL NO	PROCEDURE NO	TECHNICIAN
ALP	100Ω ±5% 1/8W	16		R J. L 7A308

CALIBRATION EQUIPMENT

MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE	MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE

CALIBRATION DATA

PROC. STEP NO. (1)	FUNCTION TESTED (2)	READING OR VALUE NOMINAL (3)	READING OR VALUE MEASURED (4)	CORRECTED VALUE OF COLUMN ____ (5)	✓ CHECK ONE: DEVIATION / CORRECTION / ERROR / ACTUAL VALUE (6)	CALIBRATION TOLERANCES LOWER LIMIT (7)	CALIBRATION TOLERANCES UPPER LIMIT (8)
	NOV 18 1965	N	R	AVER			
	1	100.009	100.029	100.019			
	2	100.000	100.020	100.010			
	3	100.020	100.030	100.025			
	4	100.023	100.042	100.032			
	5	100.019	100.035	100.027			
	6	100.031	100.048	100.039			
	7	100.030	100.048	100.039			
	8	100.028	100.044	100.036			
	9	100.019	100.037	100.023			
	10	100.030	100.048	100.039			
					10 PT AVER. 100.029Ω		
					0.029Ω DEVIATION ✓		

(CONTINUED ON REVERSE SIDE)

CALIBRATION DATA SHEET

ICE TO LN_2 REPEATABILITY

ABC 3-028-005

DATE NOV 19 1965

MANUFACTURER	MODEL NO	SERIAL NO	PROCEDURE NO	TECHNICIAN
APL	100Ω ±5% 1/8W	17	0965-01-100	R J.J. 7A308

CALIBRATION EQUIPMENT

MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE	MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE

CALIBRATION DATA

PROC STEP NO (1)	FUNCTION TESTED (2)	READING OR VALUE NOMINAL (3)	READING OR VALUE MEASURED (4)	CORRECTED VALUE OF COLUMN ____ (5)	✓ CHECK ONE: DEVIATION / CORRECTION / ERROR / ACTUAL VALUE (6)	CALIBRATION TOLERANCES LOWER LIMIT (7)	CALIBRATION TOLERANCES UPPER LIMIT (8)
	NOV 19 1965						
	TEST CYCLES	N	R	AVER			
	1	97.399	97.417	97.408			
	2	97.404	97.421	97.413			
	3	97.395	97.413	97.404			
	4	97.406	97.423	97.415			
	5	97.400	97.419	97.410			
	6	97.396	97.413	97.405			
	7	97.396	97.404	97.400			
	8	97.394	97.410	97.402			
	9	97.395	97.414	97.405			
	10	97.393	97.410	97.402			
					10 PT AVER 97.406Ω		
					0.015Ω Deviation		

(CONTINUED ON REVERSE SIDE)

ELEMENT CALIBRATION

CALIBRATION DATA SHEET

ASC 3-026-005

DATE JAN 10 1966

MANUFACTURER	MODEL NO.	SERIAL NO.	PROCEDURE NO.	TECHNICIAN
◯ NLP	100Ω ± 5% 1/8W	13		R 7A303

CALIBRATION EQUIPMENT

MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE	MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE

CALIBRATION DATA

Inverse T

PROC STEP NO. (1)	FUNCTION TESTED (2)	READING OR VALUE NOMINAL (3)	READING OR VALUE MEASURED (4)	CORRECTED VALUE OF COLUMN ____ (5)	✓ CHECK ONE: DEVIATION / CORRECTION / ERROR / ACTUAL VALUE (6)	CALIBRATION TOLERANCES LOWER LIMIT (7)	CALIBRATION TOLERANCES UPPER LIMIT (8)
100/K	30 DEC 65	STD. TEMP °K	STD. TEMP °C	STD. TEMP °F	RT Ω	Ratio RT/97.825	Inverse 100/K
0.366099	ICE	273.15	—	32.000	97.824	1.0	0.366099
0.513561	CO_2	194.719	-78.431	-109.176	100.474	1.027283	0.513561
1.292207	LN_2	77.387	-195.763	-320.374	122.350	1.250703	1.292207
3.704526	LN_2	26.994	-246.156	-411.081	185.430	1.895528	3.704526
◯	ICE	273.15	—	32.000	97.826	1.0	—

(CONTINUED ON REVERSE SIDE)

ELEMENT CALIBRATION

CALIBRATION DATA SHEET

ASC 3-028-006

DATE JAN 10 1966

MANUFACTURER	MODEL NO.	SERIAL NO.	PROCEDURE NO.	TECHNICIAN
○ ALP	100Ω ±5% 1/8W	14		7A 309

CALIBRATION EQUIPMENT

MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE	MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE

CALIBRATION DATA

PROC. STEP NO. (1)	FUNCTION TESTED (2)	READING OR VALUE NOMINAL (3)	READING OR VALUE MEASURED (4)	CORRECTED VALUE OF COLUMN ____ (5)	✓ CHECK ONE: DEVIATION / CORRECTION / ERROR / ACTUAL VALUE (6)	CALIBRATION TOLERANCES LOWER LIMIT (7)	CALIBRATION TOLERANCES UPPER LIMIT (8)
	30 DEC 65	STD. TEMP.	STD. TEMP.	STD. TEMP.	RT	Ratio	Inverse T
		°K	°C	°F	Ω	RT/96.486	100/K
	ICE	273.15	—	32.000	96,488	1.000021	0.366099
	CO_2	194.781	−78.369	−109.064	99,091	1.026999	0.513397
	LN_2	77.388	−195.762	−320.372	120,370	1.247538	1.292190
	LNe	27.059	−246.091	−410.964	181.863	1.884864	3.695628
○	ICE	273.15	—	32.000	96,485	0.999990	—
	L He	4.232	−268.918	−452.10	1196.35	12.39921	23.62949
○							

(CONTINUED ON REVERSE SIDE)

ELEMENT CALIBRATION

LINEAR DATA RECORD

AGCS 0711-36

DATE FEB - 3 1966

MANUFACTURER	MODEL NO.	SERIAL NO.	PROCEDURE NO.	TECHNICIAN
ALP	100Ω ±5% ¼W	15		R

MANUFACTURER

MODEL NO.

CALIBRATION EQUIPMENT

MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE	MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE

CALIBRATION DATA

	STD TEMP	STD TEMP	STD TEMP	RT	RATIO	Inverse T
JAN - 3 1966	°K	°C	°F	Ω	RT/96.769	100/K
ICE	—	—	32.000	96.772	1,000031	0,366099
CO_2	194.658	-78.492	-109.286	99.509	1,028315	0,513722
$\angle N_2$	77.584	-195.566	-320.018	120.789	1,248220	1,288926
$\angle Ne$ (759.750 mm/HG)	27.125	-246.025	-410.845	181.607	1,876706	3,686636
$\angle He$	4.232	-268.918	-452.10	1180.37	12,19781	23,62949
ICE	—	—	32.000	96.766	0.999969	—

(CONTINUED ON REVERSE SIDE)

ELEMENT CALIBRATION

LINEAR DATA RECORD

AGCS 0711-36

DATE 11-3-

MANUFACTURER	MODEL NO.	SERIAL NO.	PROCEDURE NO	TECHNICIAN
ALP	100Ω ± 5% 1/8W	16		R

CALIBRATION EQUIPMENT

MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE	MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE

CALIBRATION DATA

	STD. TEMP.	STD. TEMP.	STD. TEMP.	RT	RATIO	Inverse T
JAN - 3 1966	°K	°C	°F	Ω	RT/99.641	100/K
ICE	—	—	32.000	99.640	1.0	0.366099
CO_2	194.759	-78.391		102.463	1.028322	0.513455
LN_2	77.427	-195.723		123.847	1.242932	1.291539
LNe (759.750 mm/HG)	27.125	-246.025		187.967	1.886442	3.686636
LHe	4.232	-268.918		1234.57	12.39018	23.62949
ICE	—	—	32.000	99.642	1.0	—

(CONTINUED ON REVERSE SIDE)

ELEMENT CALIBRATION

LINEAR DATA RECORD

AGCS 0711-36

DATE: FEB - 3 1966

MANUFACTURER	MODEL NO	SERIAL NO	PROCEDURE NO	TECHNICIAN
ALP	100Ω ±5% 1/8W	17		R

CALIBRATION EQUIPMENT

MANUFACTURER	MODEL NO	SERIAL NO	RECALL DATE	MANUFACTURER	MODEL NO	SERIAL NO	RECALL DATE

CALIBRATION DATA

JAN - 3 1966	STD TEMP °K	STD TEMP °C	STD TEMP °F	RT Ω	RATIO RT/96.631	Inverse T 100/K
ICE	—	—	32.00	96.589	0.999565	0.366099
CO_2	194.748	-78.402		99.260	1.027207	0.513484
LN_2	77.429	-195.721		121.014	1.252331	1.291506
LNe (757.950 mm/HG)	27.059	-246.091		183.389	1.897828	3.695628
LHe	4.232	-268.918		1224.07	12.66747	23.62949
ICE	—	—	32.000	96.673	1.000435	—

(CONTINUED ON REVERSE SIDE)

ELEMENT RESPONSE STUDY

LINEAR DATA RECORD

AGCS 0711-36

DATE 19 Jan 1966

MANUFACTURER	MODEL NO	SERIAL NO	PROCEDURE NO	TECHNICIAN
Aerometrics	Dog	17		R

CALIBRATION EQUIPMENT

MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE	MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE

CALIBRATION DATA

	1TC (Sec.)	5TC (Sec.)				
Amb. to LN_2	1.1	2.95	Measurements taken in dewar partially filled with LN_2 ~3"			
↓	1.1	3.10				
	0.8	2.55				
↓	1.1	3.00				
av.	1.02	2.90				
Amb to LN_2	0.9	3.10	Used LNe jacket (full			
↓	0.8	2.75				
	1.0	3.40				
av.	0.90	3.08				
Amb to LNe	1.65	5.80				
↓	1.70	5.60				
	1.60	5.00				
↓	1.50	5.50				
av.	1.61	5.48				
LN_2 to LNe	0.17	1.85				
↓	0.14	1.40				
	0.15	1.65				
↓	0.20	2.00				
av.	0.17	0.35				
LNe to GHe	0.08	0.16	Used GHe to displace the LNe			
↓	0.05	0.11	GHe flow 120 CFH			
	0.06	0.12				
↓	0.06	0.12	Response to LN_2 temp.			
av.	0.06	0.13				

(CONTINUED ON REVERSE SIDE)

Enclosure 2
0700:1161

PRE-PRODUCTION PROTOTYPE

TRANSUCER TEST DATA

LINEAR DATA RECORD — CALIBRATION DATA

AGCS 0711-36

PREPRODUCTION PROTOTYPE TRANSDUCERS

DATE 25 APRIL 1966

MANUFACTURER	MODEL NO	SERIAL NO	PROCEDURE NO	TECHNICIAN
Aerometrics	TI-104A-200	As Noted		R / I.I. 7A308

CALIBRATION EQUIPMENT

MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE	MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE

CALIBRATION DATA

	Temp. °K	Temp. °C	Output mv ← no excitation → no load	Output mv ← no excitation → 100K Load	Output mv ← I_c = 0, 2300 ma → no load	Output mv ← I_c = 0, 2300 ma → 100K load
SN 13	[illegible]					
ICE	—	⊖	-0.046	-0.046	22.555	22.530
AMB	—	23.733	-1.455	-1.452	21.122	21.095
LN_2	77.368	-195.782	8.604	8.587	36.741	36.685
LNe	27.180	-245.970	9.545	9.526	52.045	51.935
SN 14	[illegible]					
ICE	—	⊖	-0.044	-0.044	22.340	22.312
AMB	—	23.733	-1.441	-1.380	20.914	20.890
LN_2	77.368	-195.782	8.640	8.627	36.560	36.505
LNe	27.180	-245.970	9.589	9.569	51.640	51.540
SN 15	[illegible]					
Av. of 13 ~ ICE	—	⊖	-0.037	—	22.321	—
Av. of 13 ~ AMB	—	23.124	-1.412	—	20.913	—
Av. of 13 ~ LN_2	77.437	-195.713	8.608	—	36.486	—
Av. of 13 ~ LNe	27.126	-246.024	9.554	—	51.480	—
SN 16	3 May 1966					
Av. of 13 ~ ICE	—	⊖	-0.033	—	23.057	—
Av. of 13 ~ AMB	—	23.124	-1.415	—	21.653	—
Av. of 13 ~ LN_2	77.437	-195.713	8.623	—	37.404	—
Av. of 13 ~ LNe	27.126	-246.024	9.577	—	52.894	—
SN 17	4 May 1966					
ICE	—	⊖	-0.034	-0.034	22.320	22.295
AMB	—	24.023	-1.377	-1.375	20.970	20.945
LN_2	77.413	-195.737	8.633	8.621	36.570	36.515
LNe	26.996	-246.154	9.595	9.576	52.030	51.920

(CONTINUED ON REVERSE SIDE)

RESPONSE TEST DATA
PREPRODUCTION PROTOTYPE TRANSDUCERS

LINEAR DATA RECORD
AGCS 0711-36

DATE 25 APRIL 1966

MANUFACTURER	MODEL NO.	SERIAL NO	PROCEDURE NO	TECHNICIAN
Aerometrics	TI-104A-200	As Noted		R 7A308

CALIBRATION EQUIPMENT

MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE	MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE

REMARKS

MODE ON

CALIBRATION DATA

	SN 13 1 TC (Sec)	SN 14 1 TC (Sec)	SN 15 1TC (sec)	SN 16 1TC (Sec)	SN 17 1TC (sec)
LN_2 to LNe 4 Feb 66	0,22	0,19			0,23
	0,27	0,20			0,21
	0,29	0,22			0,18
	—	—			0,19
av.	0,26	0,20			0,20
LNe to GHe	0,21	0,11			0,11
150 CFH GHe	0,24	0,10			0,13
flow 4 Feb 66	0,24	0,12			0,09
	—	—			0,09
av	0,23	0,11			0,11
AMB to LN_2 19 Jan 66			1,4	1,45	
			1,4	1,5	
			1,55	—	
av.			1,45	1,48	
AMB to LNe 19 Jan 66			2,6	3,2	
			2,9	2,95	
			2,8	—	
av.			2,76	3,08	
LN_2 to LNe 19 Jan 66			0,20	0,25	
			0,16	0,17	
			0,20	—	
av.			0,19	0,21	
LNe to GHe 19 Jan 66			0,12	0,1	
			0,10	0,14	
120 CFH GHe			0,13	—	
flow			0,13	—	
av.			0,12	0,12	

(CONTINUED ON REVERSE SIDE)

TRANSDUCER

LINEAR DATA RECORD REPEATABILITY TEST

SHEET 1 OF 2

AGCS 0711-36

DATE 25 APRIL 1966

MANUFACTURER	MODEL NO	SERIAL NO	PROCEDURE NO	TECHNICIAN
Aerometrics	TI-104A-200	SN 15		K 7A 308

CALIBRATION EQUIPMENT

MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE	MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE

CALIBRATION DATA

		Fixed Point Calibration Media	Temp. K	Temp. C	Temp. F	RTT (mv) I_c=0.23ma	TC (mv) I_c=0
27 Jan 1966	1	ICE				22,340	-0.016
		AMB		23.516	74.328	21.100	-1.300
		LN_2	77.422	-195.728		36.514	8.645
28 Jan 1966	2	ICE				22,340	-0.016
		AMB		23.450	74.210	20.910	-1.424
		LN_2	77.486	-195.668		36.490	8.637
		LNe	27.132	-246.018		51.550	9.604
	3	ICE				22,340	-0.016
		AMB		23.423	74.161	20.910	-1.402
		LN_2	77.464	-195.686		36.500	8.640
		LNe	27.123	-246.027		51.520	9.601
	4	ICE				22,339	-0.016
		AMB		24.215	75.589	20.820	-1.470
		LN_2	77.462	-195.688		36.500	8.639
		LNe	27.180	-245.970		51.556	9.600
	5	ICE				22,320	-0.015
		AMB		23.544	74.379	20.900	-1.430
		LN_2	77.464	-195.686		36.500	8.640
		LNe	27.180	-245.970		51.556	9.600
31 Jan 1966	6	ICE				22,320	-0.025
		AMB		23.167		20.919	-1.398
		LN_2	77.466	-195.684		36.510	8.640
		LNe	27.124	-246.026		51.555	9.600
	7	ICE				22,320	-0.020
		AMB		23.167		20.918	-1.400
		LN_2	77.466	-195.684		36.510	8.640
		LNe	27.112	-246.038		51.559	9.600

(CONTINUED ON REVERSE SIDE)

(CONT.) TRANSDUCER SHEET 2 OF 2

LINEAR DATA RECORD REPEATABILITY TEST

AGCS 0711-36

DATE 25 APRIL 1966

MANUFACTURER	MODEL NO.	SERIAL NO.	PROCEDURE NO	TECHNICIAN
Akrometrics	TJ-104A-200	SN 15		R 7A308

CALIBRATION EQUIPMENT

MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE	MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE

CALIBRATION DATA

	Fixed Point Calibration Media	Temp. K	Temp. C	Temp. F	RTT (mV) I_c = 0.23 ma	TC (mV) I_c = 0
	ICE				22,320	-0,060
8	AMB		23,168		20,917	-1,400
	LN_2	77,393	-195,757		36,500	8,580
	LNe	27,114	-246,036		51,470	9,550
	ICE				22,310	-0.055
9	AMB		23,452		20,850	-1,468
	LN_2	77,403	-195,747		36,480	8,572
	LNe	27,085	-246,065		51,350	9,500
	ICE				22,310	-0,055
10	AMB		22,027		20,964	-1,375
	LN_2	77,390	-195,760		36,450	8,562
	LNe	27,090	-246,060		51,430	9,500
[illegible]	ICE				22,310	-0,055
11	AMB		22,285		20,860	-1,455
	LN_2	77,381	-195,769		36,450	8,550
	LNe	27,142	-246,008		51,350	9,490
[illegible]	ICE				22,300	-0,055
12	AMB		22,639		20,894	-1,426
	LN_2	77,441	-195,709		36,450	8,578
	LNe	27,116	-246,034		51,420	9,502
[illegible]	ICE				22,310	-0,055
13	AMB		22,565		20,910	-1,406
	LN_2	77,442	-195,708		36,460	8,580
	LNe	27,116	-246,034		51,440	9,504
	ICE				22,315	-0,056
Average	ICE		~~0~~		22,321	-0,037
	AMB		23,124		20,913	-1,412
	LN_2	77,437	-195,713		36,486	8,608
↓	LNe	27,126	-246,024		51,480	9,554

CONTINUED ON REVERSE SIDE

TRANSDUCER

SHEET 1 OF 2

LINEAR DATA RECORD REPEATABILITY TEST

AGCS 0711-36

DATE 26 APRIL 1966

MANUFACTURER	MODEL NO	SERIAL NO	PROCEDURE NO	TECHNICIAN
Aerometrics	TI-104A-200	SN 16		R) I J 7F 308

CALIBRATION EQUIPMENT

MANUFACTURER	MODEL NO	SERIAL NO	RECALL DATE

CALIBRATION DATA

		Fixed Point Calibration Media	Temp K	Temp C	Temp F	RTT (mv) I_c = 0.23 ma	TC (mv) I_c = 0
27 Jan 1966		ICE				23,060	-0,014
	1	AMB		23,516	74,328	21,760	-1,400
		LN_2	77,422	-195,728		37,426	8,645
28 Jan 1966		ICE				23,060	-0,014
	2	AMB		23,450	74,210	21,630	-1,410
		LN_2	77,486	-195,668		37,425	8,658
		LNe	27,132	-246,018		52,990	9,630
		ICE				23,065	-0,014
	3	AMB		23,423	74,161	21,640	-1,390
		LN_2	77,464	-195,686		37,415	8,656
		LNe	27,123	-246,027		52,960	9,628
		ICE				23,070	-0,005
	4	AMB		24,215	75,589	21,570	-1,490
		LN_2	77,462	-195,688		37,420	8,660
		LNe	27,180	-245,970		52,990	9,635
		ICE				23,070	-0006
	5	AMB		23,544	74,379	21,620	-1,480
		LN_2	77,464	-195,686		37,420	8,660
		LNe	27,180	-245,026		52,990	9,634
31 Jan 1966		ICE				23,080	-0,010
	6	AMB		23,167		21,660	-1,393
		LN_2	77,466	-195,686		37,440	8,650
		LNe	27,180	-245,970		52,990	9,630
		ICE				23,080	-0,015
	7	AMB		23,167		21,660	-1,395
		LN_2	77,466	-195,684		37,440	8,650
		LNe	27,112	-246,038		52,990	9,630

(CONTINUED ON REVERSE SIDE)

(CONT.) TRANSDUCER SHEET 2 OF 2

LINEAR DATA RECORD REPEATABILITY TEST

AGCS 0711-36

DATE 26 APRIL 1966

MANUFACTURER	MODEL NO	SERIAL NO	PROCEDURE NO	TECHNICIAN
Aerometrics	TI-104A-200	16		R

CALIBRATION EQUIPMENT

MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE	MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE

CALIBRATION DATA

		Fixed Point Calibration Media	Temp. K	Temp. C	Temp. F	RTT (mV) I_c = 0.23 mA	TC (mV) I_c = 0
8		ICE				23,070	-0.055
		AMB		23,168		21.659	-1,394
		LN_2	77,393	-195,757		37,400	8,590
		LNe	27,114	-246,036		52,860	9,570
9		ICE				23,050	-0,055
		AMB		23,452		21,610	-1,450
		LN_2	77,403	-195,747		37,400	8,585
		LNe	27,085	-246,065		52,820	9,520
10		ICE				23,050	-0,055
		AMB		22,027		21,750	-1,347
		LN_2	77,390	-195,760		37,380	8,582
		LNe	27,090	-246,060		52,870	9,510
11		ICE				23,040	-0,054
		AMB		22,285		21,630	-1,430
		LN_2	77,381	-195,769		37,370	8,584
		LNe	27,142	-246,008		52,740	9,505
12		ICE				23,040	-0,055
		AMB		22,639		21,640	-1,420
		LN_2	77,441	-195,709		37,360	8,588
		LNe	27,116	-246,034		52,780	9,514
13		ICE				23,020	-0,056
		AMB		22,565		21,660	-1,395
		LN_2	77,442	-195,708		37,360	8,594
		LNe	27,116	-246,034		52,750	9,520
		ICE				23,040	-0,055
Average		ICE		0		23,057	-0,033
		AMB		23,124		21,653	-1,415
		LN_2	77,437	-195,713		37,404	8,623
		LNe	27,126	-246,024		52,894	9,577

(CONTINUED ON REVERSE SIDE)

Enclosure 3
0700:1161

FABRICATION DRAWINGS FOR

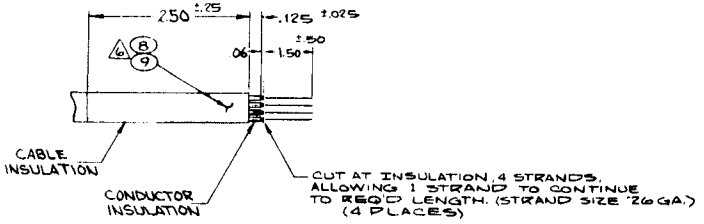
PRODUCTION TRANSDUCERS

REVISIONS				
ZONE	DESCRIPTION	DATE	APPROVED
	REVISED TO REFLECT AS BUILT CONDITION	3-4-66 CPA	HHO 3/7/66 GR R 3/4/66

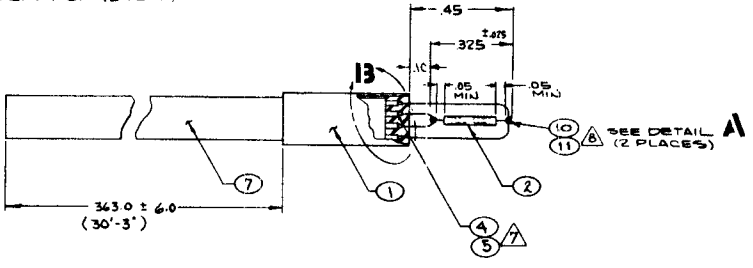
NOTES:

1. REMOVE ALL BURRS & SHARP EDGES.
2. INTERPRET DWG PER STD5 PRESCRIBED IN MIL-D-70327.
3. CLEAN TO LEVEL "H" PER AGC-46350.
4. PRESERVE & PACKAGE PER AGC-46387, CLASS I.
5. MARK PER ASD 5215N WITH PN 1126040 & APPLICABLE DASH NO.
6. CABLE & CONDUCTOR TO BE EPOXY BOND TREATED PER MFG. INSTRUCTIONS USING HEAT DRYING
7. EPOXY SHALL BE 50%-50% MIXTURE BY VOLUME CURED AT 125° ± 15° F FOR 8 HRS. MINIMUM.
8. WIRES ARE TO BE PREFORMED & SOLDERED TOGETHER WITH MINIMUM AMOUNT OF SOLDER. NEXT INSTALL RESISTOR & SOLDER IN PLACE USING COPPER HEAT SINKS BETWEEN RESISTOR BODY & SOLDER JOINT TO ASSURE MINIMUM HEAT TRANSFER TO RESISTOR BODY.
9. DURING CABLE PREPARATION & ASSEMBLY, HANDLE WITH CLEAN HANDS & AVOID EXCESSIVE BENDING OF WIRES.
10. ELECTRICAL CONTINUITY TESTS SHALL BE PERFORMED ON EACH UNIT AT AMBIENT TEMP OF 72 ± 5°F.

    BLUE TO BLACK – BETWEEN 95 & 105 OHMS
    RED TO BLUE – BETWEEN 8 & 11 OHMS
    TAN TO BLACK – BETWEEN 11 & 14 OHMS
    RED TO INSERT – GREATER THAN 100 MEGOHMS AT 50V DC



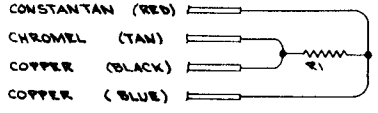
DETAIL B 4



-9 ASSEMBLY

ITEM NO.	ZONE	MATERIAL	SPECIFICATION	UNIT WT	QTY REQ	DWG OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	CODE IDENT NO.	SYM	QTY REQ
11		HANDY HARMON NEW YORK N.Y.			AR		TEC FLUX			
10		SOLDERETTE SANTA ANA, CALIF			AR		V5MOOT SOLDER-SN63.032 DIA ROSIN CORE 99.5-STC-2			
9					AR	L-2801	ADBOND	09794		
8					AR	L-2500	POLYMER COAT	09794		
7					AR	T(EX-TEXN-WW EXT-CU)	CABLE	99195		
6										
5					AR	828	EPON	86261		
4					AR	VAO	VERSAMIDE	24608		
3										
2					1	1126039	RESISTOR		R1	1
1					1	1126037-3	INSERT			1

LIST OF MATERIALS



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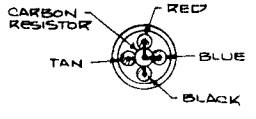


ELEMENT CONSTRUCTION END VIEW

DETAIL A

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES	DECIMAL TOLERANCE	ANGULAR TOLERANCE
	.XX ± .010	± 2°
	.XXX ± .005	

DO NOT SCALE DRAWING

TREATMENT

FINISH

	NAME	DATE
DRAWN	C. CAMPBELL	10/22/64
CHECKED		3/4/66
ENGR APPROVED	C. CAMPBELL	10/22/64
MFG APPROVED		11/23/65
QUALITY APPROVED		3/4/66
COMMODITY CODE		
DESIGN ACTIVITY APPROVED		11/9/65
CUSTOMER APPROVED		

NOMENCLATURE

REVISION LTR

SIMILAR TO

WEIGHT CALC ACT

AEROJET-GENERAL CORPORATION SACRAMENTO, CALIFORNIA

TITLE: INSERT, THERMOCOUPLE SUB ASSY.— R/TC TEMPERATURE TRANSDUCER MODEL TI-104A

CODE IDENT NO.	SIZE	DWG NO.
05824	D	1126090

SCALE NONE | RELEASE DATE 3-4-66 | SHEET

USAGE DATA							
NEXT ASSY	-9	1	1	1126091			
USED ON	PART NO.	QTY REQD PER ASSY	APPLICATION				
DRAWING LEVEL	1						

1126040

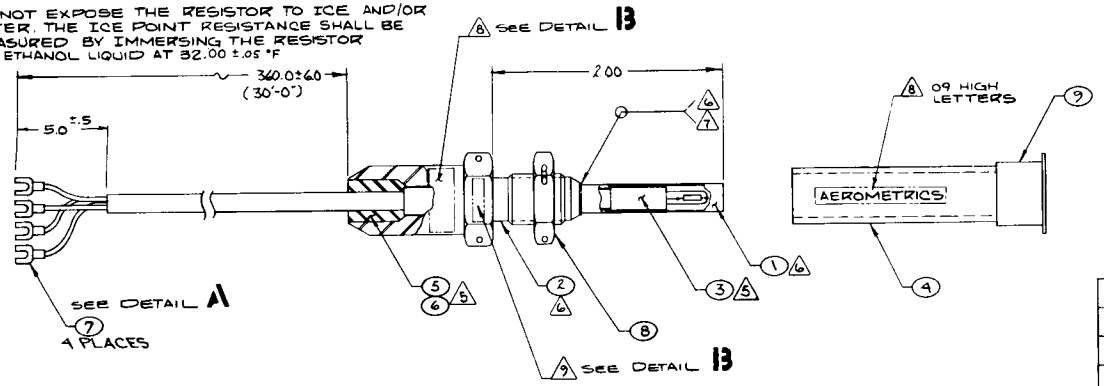
790

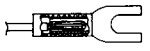
REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVED
		REVISED TO REFLECT AS BUILT CONDITIONS	3-4-66 CPA	WER 3/4/66 ARK 3/4

NOTES:

1. REMOVE ALL BURRS & SHARP EDGES.
2. INTERPRET DWG. PER STD'S. PRESCRIBED IN MIL-D-70327.
3. CLEAN TO LEVEL "H" PER AGC-46350.
4. PRESERVE & PACKAGE PER AGC-46387, CLASS I.
5. EPOXY SHALL BE 50%-50% MIXTURE BY VOLUME CURED AT 125 ±15°F FOR 8 HRS MINIMUM.
6. AT ASSEMBLY REDUCE .292 DIA ON ITEM 1 (PN 1126037-1) TO HAVE A PRESS FIT (15LBS MAX) WHEN MATED WITH ITEM 2 (PN 1126038-1) FOR EASE OF WELDMENT.
7. TIG WELD PER AGC-46351
8. MARK PER ASD 5215C
9. MARK PER ASD 5215D
10. ACCEPTANCE TESTS SHALL BE PERFORMED ON EACH UNIT MANUFACTURED PER PROCEDURE NO. (TO BE PREPARED).

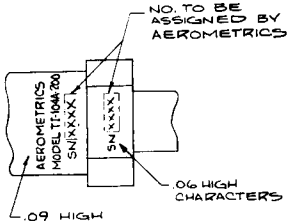
CAUTION - DO NOT EXPOSE THE RESISTOR TO ICE AND/OR WATER. THE ICE POINT RESISTANCE SHALL BE MEASURED BY IMMERSING THE RESISTOR IN ETHANOL LIQUID AT 32.00 ±.05 °F





FOLD BACK ALL STRANDS OF WIRE & CRIMP. SEAL BOTH ENDS WITH EPOXY (5)

DETAIL A
NO SCALE



DETAIL B
NO SCALE

QTY REQD	SYM	CODE IDENT. NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT	ZONE	ITEM NO.
1			MAS-813-8	CAP					9
1			1125449-1	NUT, JAM, DRILLED					8
4		79061	53206	TERMINAL					7
AR		24608	140	VERSAMIDE	EPOXY				6
AR		86961	828	EPON	EPOXY				5
1			1124976-1	TUBE, PROTECTION					4
1			1126040-9	INSERT THERMOCOUPLE SUB-ASSY.					3
1			1126038-1	BODY					2
1			1126037-1	STEM					1

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
DECIMAL TOLERANCE: XX ± .030, XXX ± .010
ANGULAR TOLERANCE: ± 2°
DO NOT SCALE DRAWING

TREATMENT
FINISH: POLISHED
SIMILAR TO

DRAWN	L CAMPBELL	10/22/65
CHECK		3/4/66
DESIGN	L CAMPBELL	10/22/65
STRESS		11/22/65
NOMENCLATURE		
MANUFACTURING RELEASE		3/4/66
DESIGN ACTIVITY APPD		11/30/65
CUSTOMER		

AEROJET-GENERAL CORPORATION
SACRAMENTO, CALIFORNIA

TITLE: TRANSDUCER, R/TC TEMPERATURE MODEL TI-109A-200

CODE IDENT. NO.	DWG SIZE	DWG NO.
05824	D	1126041

SCALE 2/1 | RELEASE DATE 3-4-66 | SHEET

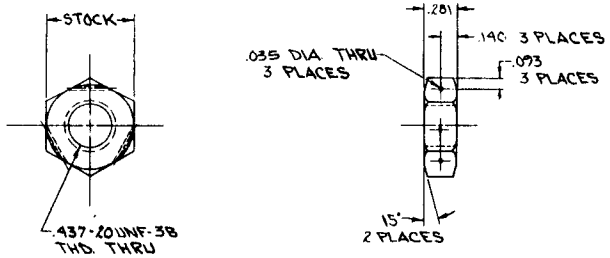
USAGE DATA | EFFECTIVE SERIAL NO. | ON | THRU | PART DASH NO. | NEXT | FINAL | QTY REQD PER ASSY | NEXT ASSY | USED ON | APPLICATION | DRAWING LEVEL 1

790

REVISIONS				
ITR	ZONE	DESCRIPTION	DATE	APPROVED
		REVISED TO REFLECT AS BUILT CONDITION	5-4-66 CPA	NCE 5/4/66 DKR 5/4

NOTES:

1. REMOVE ALL BURRS & SHARP EDGES.
2. INTERPRET DWG. PER STD'S. PRESCRIBED IN MIL-D-70327.
3. CLEAN TO LEVEL 'H' PER AGC-46350.
4. PRESERVE & PACKAGE PER AGC-46387, CLASS I.
5. ALL MACHINED SURFACES TO BE 32/ OR BETTER.
6. MARK PER ASD 5215N WITH PN 1125449.



ITR	ZONE	CODE IDENT. NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT.	CORR	ITEM NO.
			-1		.750 WRA BAR CRES TYPE 321 CONDA				

LIST OF MATERIALS

USAGE DATA							
ON	THRU	-1	1	1	112691		
EFFECTIVE SERIAL NO.		PART DASH NO.	NEXT HIGHER ASSY	FINAL ASSY	NEXT ASSY	USED ON	
			QTY REQR PER ASSY		APPLICATION		
		DRAWING LEVEL		1			

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

DECIMAL TOLERANCE	ANGULAR TOLERANCE
XX ± .03	± 2°
XXX ± .010	

DO NOT SCALE DRAWING

TREATMENT

FINISH: POLISHED

SIMILAR TO: WEIGHT: CALC. ACT.

DRAWN	D. CAMPBELL	1/20/65
STRESS	D. CAMPBELL	1/20/65
MANUF.	N.C. Chandler	11/19/65
REMANUFACTURE		
ENGINEER	[illegible]	4/4/66
DESIGN ACTIVITY APPD	[illegible]	4-20-66
CUSTOMER		

AEROJET-GENERAL CORPORATION
SACRAMENTO, CALIFORNIA

TITLE: NUT, DRILLED JAM

CODE IDENT. NO.	DWG SIZE	DWG NO.
05824	D	1125449

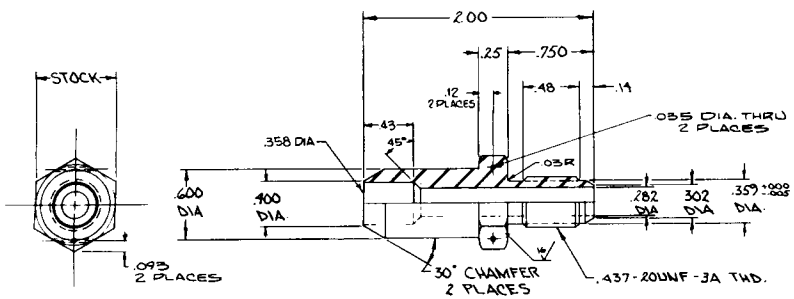
SCALE 2/1 | RELEASE DATE 5-4-66 | SHEET

1125449

REVISIONS				
DIR	ZONE	DESCRIPTION	DATE	APPROVED
		REVISED TO REFLECT AS BUILT CONDITION	3-4-66 CPA	MCE 3/4/66 CRF 3/4/66

NOTES:

1. REMOVE ALL BURRS & SHARP EDGES.
2. INTERPRET DWG PER STD'S. PRESCRIBED IN MIL-D-70327.
3. CLEAN TO LEVEL 'H' PER AGC-46350.
4. PRESERVE & PACKAGE PER AGC-46387, CLASS I.
5. MARK PER ASD 5215N WITH PN 1126038.
6. ALL MACHINED SURFACES SHALL BE 32 OR BETTER.



QTY REQD	SYM	CODE IDENT NO	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT	ZONE	ITEM NO.
			-1		.75 WRX 9.0 CORES TYPE 321	COND. A			

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
DECIMAL TOLERANCE: XX ± .010, XXX ± .005
ANGULAR TOLERANCE: ± 2°
DO NOT SCALE DRAWING

DRAWN: C. CAMPBELL 10/22/65
ENGR: T. Clarke 3/4/66
STRESS: S. CAMPBELL 10/22/65
MFG: M. Clarke 11/22/65
MANUFACTURING ENGR: L. Schmidt 3/4/66
DESIGN ACTIVITY APPD: CRF 3/4/66 11/30/65
CUSTOMER:

TREATMENT:
FINISH:
NOMENCLATURE:
STRESS INTEGRITY:
SIMILAR TO:
WEIGHT: CALC. ACT.

AEROJET-GENERAL CORPORATION · SACRAMENTO, CALIFORNIA

TITLE: BODY — R/TC TEMPERATURE TRANSDUCER MODEL TI-109A

CODE IDENT NO. 05824 | DWG SIZE D | DWG NO. 1126038

SCALE 2/1 | RELEASE DATE 3-4-66 | SHEET

ON	THRU
EFFECTIVE SERIAL NO.	
USAGE DATA	

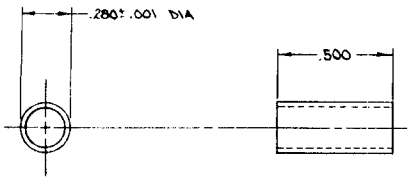
PART EACH NO	NEXT	FINAL	NEXT ASSY	USED ON
-1			1126091	
QTY REQD PER ASSY	APPLICATION			
DRAWING LEVEL 1				

1126038

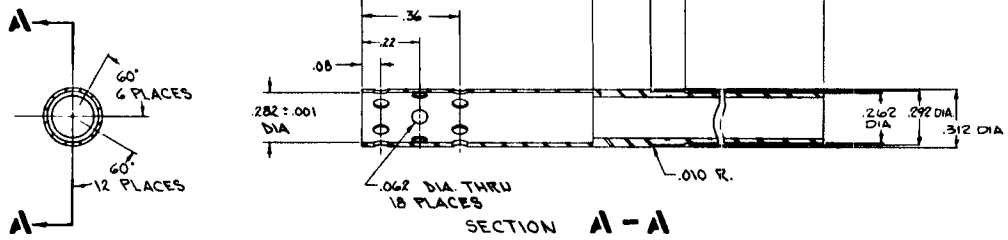
REVISIONS				
ZONE	ECNO	DESCRIPTION	DATE	APPROVED
		REVISED TO REFLECT AS BUILT CONDITION	5-4-66 CPA	ARE 1/17/66 4/1/66

NOTES:

1. REMOVE ALL BURRS & SHARP EDGES.
2. INTERPERT DWG PER STD'S PRESCRIBED IN MIL-D-70327.
3. CLEAN TO LEVEL 'H' PER AGC 46350.
4. PRESERVE & PACKAGE PER AGC-46387, CLASS 1.
5. MARK PER ASD 5215N WITH PN 1126037 & APPLICABLE DASH NO.
6. ALL MACHINED SURFACES TO BE 32 OR BETTER.



-3 DETAIL



SECTION A-A

-1 DETAIL

QTY REQD	SYM	CODE IDENT NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT	ZONE	ITEM NO.
			-3	INSERT	.312 TUBING WALL THICKNESS .035 CRES TYPE 321 COND 'A'				
			-1	STEM					

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
DECIMAL TOLERANCE XX ± .010 XXX ± .003
ANGULAR TOLERANCE ± 2°
DO NOT SCALE DRAWING

DRAWN	G. CAMPBELL	10/13/65
CHECKED	A.F. Chandler	3/4/66
STRESS	G. CAMPBELL	10/22/65
PROJ ENGR	A.C. Clayton	11/22/65
TREATMENT		
FINISH		
MANUFACTURING	Wm Brooks	3/4/66
DESIGN ACTIVITY APPD	AR Klein	11/30/65
CUSTOMER		

AEROJET-GENERAL CORPORATION SACRAMENTO, CALIFORNIA

TITLE: STEM & INSERT - R/TC TEMPERATURE TRANSDUCER MODEL TI-1098-200

CODE IDENT NO.	SIZE	DWG NO.
05824	D	1126037

SCALE 4/1 RELEASE DATE 5-4-66 SHEET

PART DASH NO.	QTY REQD PER ASSY	NEXT ASSY	WHERE USED (BUILT INTO)
-3	1	1	1126040
-1	1	1	1126041

USAGE DATA — EFFECTIVE SERIAL NO. — THRU

DRAWING LEVEL 1

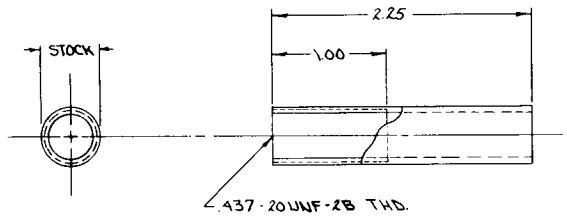
SIMILAR TO — WEIGHT: CALC / ACT

1126037

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVED
		REVISED TO REFLECT AS BUILT CONDITION	3-4-66 CPA	MRR 3/4/66 DRF 3/4

NOTES:

1. REMOVE ALL BURRS & SHARP EDGES.
2. INTERPRET DWG. PER STD'S. PRESCRIBED IN MIL-D-70327.
3. CLEAN TO LEVEL "H" PER AGC-46350.
4. MARK PER ASD 5215N WITH PN 1124976.
5. MACHINED SURFACES TO BE 63 OR BETTER



QTY REQD	SYM	CODE IDENT NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT	ZONE	ITEM NO.
1			-1		.50 TUBE, WALL THK .058 ALUM ALLOY 6061-T6				

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES			
DECIMAL TOLERANCE	ANGULAR TOLERANCE	DRAWN P. CAMPBELL	10/22/65
XX ±	± 2°	CHECK M. R. Chandler	3/4/66
XXX ±		ENGR S. CAMPBELL	10/22/65
DO NOT SCALE DRAWING		STRESS M. R. Chandler	11/22/65
TREATMENT		NOMENCLATURE	
FINISH POLISHED		PROJ ENGR R. Brown	3/4/66
		DESIGN ACTIVITY APPD. DR Brown	11/30/65
		CUSTOMER	

AEROJET-GENERAL CORPORATION
SACRAMENTO, CALIFORNIA

TITLE TUBE, PROTECTION

CODE IDENT NO.	SIZE	DWG NO.
05824	D	1124976

SCALE 2/1 | RELEASE DATE 3-4-66 | SHEET

ON	THRU	PART DASH NO	NEXT	FINAL	NEXT ASSY	USED ON
		-1	1	1	1126091	

EFFECTIVE SERIAL NO. — USAGE DATA

QTY REQD PER ASSY — APPLICATION

DRAWING LEVEL 1

SIMILAR TO — WEIGHT: CALC / ACT

1124976

790

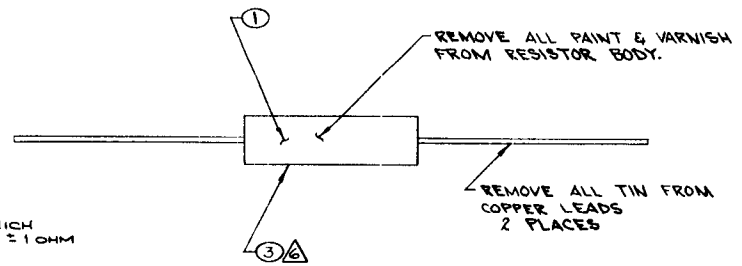
DIVISIONS				
NO.	ZONE	DESCRIPTION	DATE	APPROVED
		REVISED TO REFLECT AS BUILT CONDITION	8-1-66 CPA	MEC 3/1/66 GWR 3/1/66

NOTES:

1. REMOVE ALL BURRS & SHARP EDGES.
2. INTERPRET DWG PER STD'S PRESCRIBED IN MIL-D-70327.
3. CLEAN TO LEVEL "H" PER AGC 46350.
4. PRESERVE & PACKAGE PER AGC-46387, CLASS I.
5. MARK PER ASD 5215N WITH PN 1126039.
6. APPLY RESIN WITH MIN. THICKNESS, CURE UNDER PRESSURE OF 50 PSIG FOR TWO (2) HOURS AT AMBIENT TEMPERATURE, (72°F ± 5°F) DRY AT 100°F FOR A MIN. OF 24 HOURS.

4. ACCEPTANCE TEST SHALL BE PERFORMED ON EACH UNIT MANUFACTURED.

CAUTION - DO NOT EXPOSE THE RESISTOR TO ICE AND/OR WATER. THE ICE POINT RESISTANCE SHALL BE MEASURED BY IMMERSING THE RESISTOR IN ETHANOL LIQUID AT 32.00 ± 0.05 °F.



4 ACCEPTANCE TEST

STEP 1 - PRE SELECTION

ONLY CURED AND TREATED RESISTORS WHICH HAVE AN ICE POINT RESISTANCE OF 97.5 ± 1 OHM SHALL BE ACCEPTABLE.

STEP 2 - REPEATABILITY TEST

CYCLE EACH RESISTOR BETWEEN LIQUID NITROGEN & AMBIENT TEMP (72 ±5°F) TEN TIMES. MEASURE & RECORD THE ICE POINT RESISTANCE BEFORE EACH CYCLE. ONLY RESISTORS WHICH REPEAT THE ICE POINT RESISTANCE WITHIN ±0.05 OHMS OF THE INITIAL MEASUREMENT ARE ACCEPTABLE.

STEP 3 - PRE-CALIBRATION TESTS

MEASURE & RECORD THE RESISTANCE AT TEN TEMPERATURES WITHIN THE TEMPERATURE SPAN OF +140 TO -425°F.

LIST OF MATERIALS										
QTY PER	SYM	CODE IDENT NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT OF	ZONE	ITEM NO.
AR		83309	GLYPTOL 7031	RESIN					3
									2
1		01121	-1	RESISTOR	100 Ω, 1%, ½ WATT CARBON TYPE RN				1

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
DECIMAL TOLERANCE XX ± .010 XXX ± .005
ANGULAR TOLERANCE ± 2°
DO NOT SCALE DRAWING

TREATMENT
FINISH
SIMILAR TO
WEIGHT CALC ACT

DRAWN	C. CAMPBELL	11/22/65
TECH	M.E. Chandler	3/4/66
ENGR	M.E. Chandler	11/22/65
PROJ ENGR	M.E. Chandler	11/22/65
STRESS WEIGHT		
NOMENCLATURE		
MANUFACTURING ENGR		
DESIGN ACTIVITY APPD		6/6/66
CUSTOMER		6/30/65

AEROJET-GENERAL CORPORATION
SACRAMENTO, CALIFORNIA

TITLE: ELEMENT, RESISTOR — R/TC TEMPERATURE TRANSDUCER MODEL TT-109

CODE IDENT. NO.	SIZE	DWG NO.
05824	D	1126039

SCALE NONE | RELEASE DATE 5-9-66 | SHEET

USAGE DATA							
ON	TYPE	EFFECTIVE SERIAL NO.	PART DASH NO.	NEXT HIGHER ASSY	FINAL NEXT ASSY	USED ON APPLICATION
			-1	1	1	1126040
			QTY REQD PER ASSY			

DRAWING LEVEL 1

1126039

Enclosure 4
0700:1161

ELEMENT ICE TO LN_2 REPEATABILITY

TEST DATA FOR 13 PRODUCTION TRANSDUCERS

CALIBRATION DATA SHEET

ICE TO LN_2

ASC 3-026-006

DATE OCT 28 1965

MANUFACTURER	MODEL NO.	SERIAL NO.	PROCEDURE NO.	TECHNICIAN
AEROMETRICS	1126039	2		R 7A308

MANUFACTURER

MODEL NO.

CALIBRATION EQUIPMENT

FUNCTION	MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE
	LEA	8069R	1564785	25FEB66
	"	9835	156915 2	3MAR66

CALIBRATION DATA

PROC. STEP NO. (1)	FUNCTION TESTED (2)	READING OR VALUE NOMINAL (3)	READING OR VALUE MEASURED (4)	CORRECTED VALUE OF COLUMN _____ (5)	✓ CHECK ONE: DEVIATION / CORRECTION / ERROR / ACTUAL VALUE (6)	CALIBRATION TOLERANCES LOWER LIMIT (7)	CALIBRATION TOLERANCES UPPER LIMIT (8)
	OCT 26 1965	N	R	AVER.			
	TEST CYCLES 1	96.959	96.979	96.969			
	2	96.968	96.985	96.977			
	3	96.972	96.992	96.982			
	4	96.969	96.986	96.978			
	5	96.961	96.979	96.970			
	6	96.963	96.984	96.974			
	7	96.960	96.978	96.969			
	8	96.972	96.992	96.982			
	9	96.964	96.984	96.974			
	10	96.972	96.992	96.982	10 PT. AVER 96.974		
					0.0142 DEVIATION		
	Acceptable per dwg 1126039 (5 steps Mod 2)						
					W.C. Chandler 9 March 66		

(CONTINUED ON REVERSE SIDE)

CALIBRATION DATA SHEET

ICE TO N_2

ASC 3-026-005

DATE OCT 28 1965

MANUFACTURER	MODEL NO.	SERIAL NO.	PROCEDURE NO.	TECHNICIAN
AEROMETRICS	1126039	4		R

MANUFACTURER / MODEL NO.

CALIBRATION EQUIPMENT

MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE	MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE
LEA	2510	126					
	7651	1503					

CALIBRATION DATA

PROC. STEP NO. (1)	FUNCTION TESTED (2)	READING OR VALUE NOMINAL (3)	READING OR VALUE MEASURED (4)	CORRECTED VALUE OF COLUMN ____ (5)	✓ CHECK ONE: DEVIATION / CORRECTION / ERROR / ACTUAL VALUE (6)	CALIBRATION TOLERANCES LOWER LIMIT (7)	CALIBRATION TOLERANCES UPPER LIMIT (8)
	OCT 28 1965	N	R	AVER			
	1	98.254	98.276 Ω	98.265 Ω			
	2	98.267	98.272	98.280			
	3	98.271	98.276	98.271			
	4	98.271	98.273	98.272			
	5	98.268	98.286	98.277			
	6	98.284	98.297	98.296			
	7	98.264	98.286	98.275			
	8	98.262	98.283	98.273			
	9	98.265	98.278	98.267			
	10	98.268	98.280	98.281	10 PT. AVER	98.274Ω	
						0.022Ω	DEVIATION
	Accept-able per Dwg			1126039	(Steps 1 and 2) H. C. Chandler	9 March 66	

(CONTINUED ON REVERSE SIDE)

CALIBRATION DATA SHEET ICE TO LN_2

ASC S-026-008

DATE NOV - 1 1965

MANUFACTURER	MODEL NO	SERIAL NO	PROCEDURE NO.	TECHNICIAN
AEROMETRICS	1126039	5		R I 7A I 308

MAINTENANCE

CALIBRATION EQUIPMENT

MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE	MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE

MODEL NO

CALIBRATION DATA

PROC. STEP NO. (1)	FUNCTION TESTED (2)	READING OR VALUE NOMINAL (3)	READING OR VALUE MEASURED (4)	CORRECTED VALUE OF COLUMN ____ (5)	✓ CHECK ONE: DEVIATION / CORRECTION / ERROR / ACTUAL VALUE (6)	CALIBRATION TOLERANCES LOWER LIMIT (7)	CALIBRATION TOLERANCES UPPER LIMIT (8)
		N	R	AVER.			
	TEST CYCLES 1	96.558Ω	96.576Ω	96.567Ω			
	2	96.564	96.585	96.575			
	3	96.571	96.589	96.580			
	4	96.564	96.584	96.574			
	5	96.579	96.595	96.587			
	6	96.578	96.594	96.586			
	7	96.577	96.592	96.585			
	8	96.579	96.594	96.587			
	9	96.578	96.593	96.586			
	10	96.577Ω	96.591Ω	96.584Ω		10 PT. AVER 0.020Ω DEVIATION	96.581Ω
	Acceptable per dwg 1126039 (steps 1 and 2) H. C. Chandler						

(CONTINUED ON REVERSE SIDE)

CALIBRATION DATA SHEET

ICE TO LN2

ASC 3-026-005

DATE NOV - 2 1965

MANUFACTURER	MODEL NO	SERIAL NO.	PROCEDURE NO	TECHNICIAN
AEROMETRICS	1126039	6	0965-01-100	I I 7A 208

CALIBRATION EQUIPMENT

MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE	MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE

CALIBRATION DATA

PROC STEP NO. (1)	FUNCTION TESTED (2)	READING OR VALUE NOMINAL (3)	READING OR VALUE MEASURED (4)	CORRECTED VALUE OF COLUMN ____ (5)	✓ CHECK ONE (6)	CALIBRATION TOLERANCES LOWER LIMIT (7)	CALIBRATION TOLERANCES UPPER LIMIT (8)
	NOV - 1 1965				DEVIATION		
					CORRECTION		
					ERROR		
					ACTUAL VALUE		
	Test Cycles	N	R	AVER			
	1	97.067	97.085	97.076			
	2	97.080	97.099	97.090			
	3	97.074	97.091	97.083			
	4	97.082	97.100	97.091			
	5	97.092	97.108	97.100			
	6	97.086	97.103	97.095			
	7	97.105	97.120	97.113			
	8	97.100	97.120	97.110			
	9	97.090	97.105	97.098			
	10	97.094	97.112	97.103		10 AT AVER	97.096 ± 0.037 DEVIATION
	Acceptable per drwg 1126139 (Steps 1 and 2)						
				N.C. Chandler		9 March 66	

(CONTINUED ON REVERSE SIDE)

CALIBRATION DATA SHEET

ASC 3-026-008

DATE NOV - 5 1965

MANUFACTURER	MODEL NO.	SERIAL NO.	PROCEDURE NO.	TECHNICIAN
AEROMETRICS	1126039	9		R 7A308

CALIBRATION EQUIPMENT

MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE	MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE

CALIBRATION DATA

PROC. STEP NO. (1)	NOV - 4 1965 FUNCTION TESTED (2)	READING OR VALUE NOMINAL (3)	READING OR VALUE MEASURED (4)	CORRECTED VALUE OF COLUMN _____ (5)	✓ CHECK ONE: DEVIATION / CORRECTION / ERROR / ACTUAL VALUE (6)	CALIBRATION TOLERANCES LOWER LIMIT (7)	CALIBRATION TOLERANCES UPPER LIMIT (8)
	Test Cycles	N	R	AVER.			
	1	97.473	97.471	97.482			
	2	97.484	97.505	97.495			
	3	97.480	97.500	97.490			
	4	97.493	97.509	97.501			
	5	97.498	97.517	97.508			
	6	97.502	97.521	97.512			
	7	97.488	97.507	97.498			
	8	97.488	97.508	97.498			
	9	97.498	97.516	97.307			
	10	97.500	97.520	97.310			
					10 AT AVER 97.500 ✓		
					ΔR_T = 0.028 ✓		
	Acceptable per dwg 1126039 (Steps 1 and 2)						
				H. C. Chandler 9 March 66			

(CONTINUED ON REVERSE SIDE)

CALIBRATION DATA SHEET

AGC 3-026-006

DATE NOV - 8 1965

MANUFACTURER	MODEL NO.	SERIAL NO.	PROCEDURE NO.	TECHNICIAN
AEROMETRICS	1126039	10		R

CALIBRATION EQUIPMENT

MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE	MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE

CALIBRATION DATA

PROC STEP NO. (1)	FUNCTION TESTED NOV - 5 1965 (2)	READING OR VALUE NOMINAL (3)	READING OR VALUE MEASURED (4)	CORRECTED VALUE OF COLUMN ____ (5)	✓ CHECK ONE (6)	CALIBRATION TOLERANCES LOWER LIMIT (7)	CALIBRATION TOLERANCES UPPER LIMIT (8)
	Test Cycles	N	R	AVER	DEVIATION		
	1	97.189	97.206	97.198	CORRECTION		
	2	97.205	97.225	97.215	ERROR		
	3	97.197	97.214	97.206	ACTUAL VALUE		
	4	97.204	97.224	97.214			
	5	97.202	97.220	97.211			
	6	97.201	97.219	97.210			
	7	97.214	97.230	97.222			
	8	97.215	97.234	97.225			
	9	97.211	97.230	97.221			
	10	97.210	97.227	97.219			

10 PT AVER 97.214

0.027Ω DEVIATION

Acceptable per dwg 1126039 (Steps 1 and 2)

H.C. Clemalon 9 March 66

(CONTINUED ON REVERSE SIDE)

CALIBRATION DATA SHEET

ASC 3-026-008

DATE: NOV - 8 1965

MANUFACTURER	MODEL NO.	SERIAL NO.	PROCEDURE NO.	TECHNICIAN
AEROMETRICS	1126039	11		7A308

MANUFACTURER / MODEL NO.

CALIBRATION EQUIPMENT

MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE	MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE

CALIBRATION DATA

PROC. STEP NO. (1)	FUNCTION TESTED (2)	READING OR VALUE NOMINAL (3)	READING OR VALUE MEASURED (4)	CORRECTED VALUE OF COLUMN ____ (5)	✓ CHECK ONE: DEVIATION / CORRECTION / ERROR / ACTUAL VALUE (6)	CALIBRATION TOLERANCES LOWER LIMIT (7)	CALIBRATION TOLERANCES UPPER LIMIT (8)
	Test Cycles	N	R	AVER			
	1	96.801	96.815	96.808			
	2	96.816	96.834	96.825			
	3	96.831	96.845	96.838			
	4	96.831	96.849	96.840			
	5	96.830	96.847	96.839			
	6	96.842	96.860	96.851			
	7	96.825	96.841	96.833			
	8	96.838	96.856	96.847			
	9	96.838	96.854	96.846			
	10	96.838	96.858	96.848			
					10 PT AVER 96.835		
					0.003 DEVIATION		

Acceptable per dwg 1126039 (Steps 1 and 2)
H.C. Chandler (9 March 66)

(CONTINUED ON REVERSE SIDE)

CALIBRATION DATA SHEET

AGC 3-028-005

DATE NOV - 9 1965

MANUFACTURER	MODEL NO.	SERIAL NO.	PROCEDURE NO.	TECHNICIAN
AEROMETRICS	1126039	12		7A308

CALIBRATION EQUIPMENT

MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE	MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE

MANUFACTURER / MODEL NO.

CALIBRATION DATA

PROC. STEP NO. (1)	NOV - 9 1965 FUNCTION TESTED (2)	READING OR VALUE NOMINAL (3)	READING OR VALUE MEASURED (4)	CORRECTED VALUE OF COLUMN ____ (5)	✓ CHECK ONE: DEVIATION / CORRECTION / ERROR / ACTUAL VALUE (6)	CALIBRATION TOLERANCES LOWER LIMIT (7)	CALIBRATION TOLERANCES UPPER LIMIT (8)
	TEST CYCLES	N	R	AVER			
	1	97.475	97.493	97.484			
	2	97.503	97.521	97.512			
	3	97.512	97.528	97.520			
	4	97.512	97.531	97.522			
	5	97.519	97.537	97.528			
	6	97.519	97.539	97.529			
	7	97.514	97.533	97.524			
	8	97.513	97.535	97.524			
	9	97.512	97.532	97.522			
	10	97.517	97.537	97.527			
	11	97.516	97.534	97.525			
	12	97.519	97.537	97.528			
	13	97.516	97.534	97.525			
	14	97.515	97.532	97.524			
	15	97.518	97.530	97.522			
	16	97.517	97.534	97.525			
	17	97.516	97.534	97.525			
	18	97.518	97.530	97.522			
	19	97.517	97.537	97.527			
	20	97.516	97.534	97.525			
					20 AT AVER 97.522 ±		
					ΔR = 0.045 ±		
	Acceptable	yes	dig	1126039	(steps 1 and 2)		
					H.A. Chandler 2 Mar 66		

(CONTINUED ON REVERSE SIDE)

CALIBRATION DATA SHEET

AGC 3-028-008

DATE NOV 29 1965

MANUFACTURER	MODEL NO.	SERIAL NO.	PROCEDURE NO.	TECHNICIAN
AEROMETRICS	1126039	19		R 7A308

CALIBRATION EQUIPMENT

MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE	MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE

CALIBRATION DATA

PROC. STEP NO. (1)	FUNCTION TESTED NOV 29 1965 (2)	READING OR VALUE NOMINAL (3)	READING OR VALUE MEASURED (4)	CORRECTED VALUE OF COLUMN ____ (5)	✓ CHECK ONE: DEVIATION / CORRECTION / ERROR / ACTUAL VALUE (6)	CALIBRATION TOLERANCES LOWER LIMIT (7)	CALIBRATION TOLERANCES UPPER LIMIT (8)
	Test Cycles	N	R	AVER			
	1	97.188Ω	97.206Ω	97.197Ω			
	2	97.180	97.196	97.188			
	3	97.206	97.223	97.215			
	4	97.208	97.225	97.217			
	5	97.208	97.225	97.217			
	6	97.207	97.225	97.216			
	7	97.211	97.228	97.220			
	8	97.220	97.238	97.229			
	9	97.223	97.237	97.230			
	10	97.222Ω	97.238Ω	97.229Ω			
					10 PT AVER 97.216		
					0.033Ω DEVIATION		
	Acceptable per dwg 1126039 (Steps 1 and 2)						
					H.C. Chandler 9 March 66		

(CONTINUED ON REVERSE SIDE)

CALIBRATION DATA SHEET 10N 100 Tr 1 1/2

ASC 5-028-008

DATE MAR - 7 1966

MANUFACTURER	MODEL NO.	SERIAL NO.	PROCEDURE NO.	TECHNICIAN
AEROMETRICS	1126039	22		R

CALIBRATION EQUIPMENT

MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE	MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE

CALIBRATION DATA

PROC. STEP NO. (1)	FUNCTION TESTED (2)	READING OR VALUE NOMINAL (3)	READING OR VALUE MEASURED (4)	CORRECTED VALUE OF COLUMN ____ (5)	✓ CHECK ONE: DEVIATION / CORRECTION / ERROR / ACTUAL VALUE (6)	CALIBRATION TOLERANCES LOWER LIMIT (7)	CALIBRATION TOLERANCES UPPER LIMIT (8)
		N	R	AVE R			
	1	98.358	98.508	98.433			
	2	98.364	98.512	98.438			
	3	98.370	98.517	98.444			
	4	98.378	98.525	98.451			
	5	98.376	98.524	98.450			
	6	98.375	98.523	98.449			
	7	98.385	98.534	98.460			
	8	98.379	98.524	98.452			
	9	98.382	98.526	98.454			
	10	98.385	98.530	98.458			
			Av.	98.449 Ω			
			ΔR	0.027 Ω			

Acceptable per chg 1126039 (Steps 1 and 2)
H.C. Chandler 9 March 66

(CONTINUED ON REVERSE SIDE)

CALIBRATION DATA SHEET

AEC 3-026-006

DATE: MAR - 9 1966

MANUFACTURER	MODEL NO.	SERIAL NO.	PROCEDURE NO.	TECHNICIAN
HEROMETRICS	1126039	7"		J.T. 7A308

CALIBRATION EQUIPMENT

MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE	MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE

CALIBRATION DATA

PROC. STEP NO. (1)	FUNCTION TESTED (2)	READING OR VALUE NOMINAL (3)	READING OR VALUE MEASURED (4)	CORRECTED VALUE OF COLUMN ____ (5)	✓ CHECK ONE: DEVIATION / CORRECTION / ERROR / ACTUAL VALUE (6)	CALIBRATION TOLERANCES LOWER LIMIT (7)	CALIBRATION TOLERANCES UPPER LIMIT (8)
		"	"	"			
1		96.556	96.685	96.621			
2		96.565	96.713	96.639			
3		96.565	96.717	96.641			
4		96.570	96.720	96.645			
5		96.571	96.724	96.648			
6		96.574	96.724	96.649			
7		96.577	96.727	96.652			
8		96.583	96.725	96.650			
9		96.577	96.727	96.653			
10		96.579	96.724	96.652			
					10 PT AVER		96.645 Ω
					ΔR_T 0.033 Ω		
	Acceptable per dwg 1126039				(STEPS 1 and 2)		
					W.C. Chandler 9 March 66		

(CONTINUED ON REVERSE SIDE)

CALIBRATION DATA SHEET

ASC 3-026-005

DATE MAR - 8 1966

MANUFACTURER	MODEL NO	SERIAL NO	PROCEDURE NO.	TECHNICIAN
HEROMETRICS	1126039	74		R

CALIBRATION EQUIPMENT

MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE	MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE

CALIBRATION DATA

PROC. STEP NO. (1)	FUNCTION TESTED (2)	READING OR VALUE NOMINAL (3)	READING OR VALUE MEASURED (4)	CORRECTED VALUE OF COLUMN _____ (5)	✔ CHECK ONE: DEVIATION / CORRECTION / ERROR / ACTUAL VALUE (6)	CALIBRATION TOLERANCES LOWER LIMIT (7)	CALIBRATION TOLERANCES UPPER LIMIT (8)
		N	R	AVG R			
	1	98.271	98.617	[illegible]			
	2	98.311	98.963	98.389			
	3	98.312	[illegible]	98.387			
	4	[illegible]	98.955	98.395			
	5	98.312	98.952	98.382			
	6	98.306	98.952	98.379			
	7	98.300	98.996	98.373			
	8	98.317	98.956	98.386			
	9	98.319	98.455	98.387			
	10	98.316	98.452	98.384			
		average		98.380			
			ΔR = 0.050				

Acceptable per dwg 1126039 (Steps 1 and 2)
N. C. Cha...Co. - 9 March 66

(CONTINUED ON REVERSE SIDE)

CALIBRATION DATA SHEET 10 ea Ice to LN2

ASC 3-028-008

DATE MAR - 8 1966

MANUFACTURER	MODEL NO.	SERIAL NO.	PROCEDURE NO.	TECHNICIAN
HERMETRICS ~ HEP	1126039 100 Ω 1/8 W	25		R

CALIBRATION EQUIPMENT

MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE	MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE

CALIBRATION DATA

PROC. STEP NO. (1)	FUNCTION TESTED (2)	READING OR VALUE NOMINAL (3)	READING OR VALUE MEASURED (4)	CORRECTED VALUE OF COLUMN ____ (5)	✓ CHECK ONE: DEVIATION / CORRECTION / ERROR / ACTUAL VALUE (6)	CALIBRATION TOLERANCES LOWER LIMIT (7)	CALIBRATION TOLERANCES UPPER LIMIT (8)
		N	R	N R			
1		98.070	98.210	98,140			
2		98.075	98.220	98.148			
3		98.087	98.229	98.158			
4		98.087	98.231	98.159			
5		98.089	98.235	98,162			
6		98.089	98.232	98,160			
7		98.086	98.229	98.158			
8		98.089	98.230	98.160			
9		98,090	98.235	98,162			
10		98.086	98.234	98,160			
			Ave.	98.157 Ω			
			ΔR = 0.022 Ω				
	Acceptable per dwg 1126039				(Steps 1 and 2) H. C. Chandler 9 March 66		

(CONTINUED ON REVERSE SIDE)

Enclosure 5
0700:1161

ELEMENT CALIBRATION DATA

FOR 13 PRODUCTION TRANSDUCERS

GROUP CALIBRATION (SN 2, 5, 11, 12 & 19)
P/O TI-104A-200

LINEAR DATA RECORD

AGCS 0711-36

DATE MAR 15 1966

MANUFACTURER	MODEL NO.	SERIAL NO.	PROCEDURE NO.	TECHNICIAN
AEROMETRICS	1126 039	2		R TI 7A308

CALIBRATION EQUIPMENT

MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE	MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE
SAME AS S/N 4							

CALIBRATION DATA

	STD °K	STD °C	100/K	RT Ω	RATIO RT/97.038
MAR - 1 1966					
ICE				97.038	1.000000
MAR - 2 1966					
ICE				97.038	1.000000
CO_2	195.454	-77.696	0.511629	99.640	1.026814
LN_2	77.474	-195.676	1.290751	121.620	1.253323
LNe	27.070	-246.080	3.694127	184.420	1.900493
MAR - 3 1966					
ICE				97.040	1.000021
MAR - 7 1966					
ICE				97.080	1.000433
CRYOSTAT	77.446	-195.704	1.291222	121.616	1.253282
MAR - 8 1966					
CRYOSTAT	93.410	-179.740	1.070549	114.892	1.183990
	88.200	-184.950	1.133786	117.132	1.207074
	63.701	-209.449	1.569834	129.360	1.333086
	48.065	-225.085	2.080515	143.020	1.473856
	38.882	-234.268	2.571884	155.884	1.606422
	31.360	-241.790	3.188776	171.600	1.768379
	23.156	-249.994	4.318535	201.132	2.072714
	19.346	-253.804	5.169027	224.060	2.308992
MAR - 9 1966					
60 °C	333.193	60.043	0.300126	97.320	1.002906
ICE				97.080	1.000433
Acceptable per drg	1126039	(Step 3)	H C Chamberlain		15 March 66

(CONTINUED ON REVERSE SIDE)

GROUP CALIBRATION (SN, 4, 22, 23, 24, & 25)

LINEAR DATA RECORD

AGCS 0711-36

P/O T1-104A-200

DATE MAR 15 1966

MANUFACTURER	MODEL NO.	SERIAL NO.	PROCEDURE NO.	TECHNICIAN
AEROMETRICS	1126039	4		R. J. 7A 308

CALIBRATION EQUIPMENT

MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE	MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE
ROH	162D	162	4/27/6				
LEA	80695	1564785	2/17/7				
"	7559	1594791	8/3/6				
"	7553	1228751	9/27/6				
"	7835	1567152	9/3/6				
HAR	865B	1262	7/28/6				
EPA	100	702608	7/10/6				

CALIBRATION DATA

	STD °K	STD °C	100/K	RT Ω	RATIO RT/98.264	RATIO RT/98.320
MAR - 9 1966						
ICE				98.264	1.000000	
LN_2	77.519	-195.631	1.290001	123.128	1.253033	
ICE				98.264	1.000000	
CRYOSTAT	42.124	-231.673	2.373943	152.692	1.553896	
	37.785	-235.366	2.646552	159.900	1.627250	
	30.956	-242.195	3.230440	175.160	1.782546	
	26.471	-246.679	3.777661	189.488	1.928357	
	23.290	-249.860	4.293631	203.560	2.071563	
	19.295	-253.855	5.182689	227.928	2.319548	
	20.871	-252.279	4.791338	216.960	2.207930	
AMBIENT	295.440	22.290	0.338479	98.216	0.999512	
ICE				98.320		1.000000
60°C	331.390	58.240	0.3017592	98.524		1.002075
CO_2	194.689	-78.461	0.5136390	100.916		1.026404
ICE				98.316		0.999959
Acceptable per dwg	1126039 (Sty 3)			H.C.	Chandler	15 Mar 66

(CONTINUED ON REVERSE SIDE)

GROUP CALIBRATION (SN 2, 5, 11, 12 + 19)

LINEAR DATA RECORD

AGCS 0711-36

p/o TI-104A-200

DATE: MAR 15 1966

MANUFACTURER	MODEL NO	SERIAL NO	PROCEDURE NO	TECHNICIAN
AEROMETRICS	1126039	5		R ZA306

CALIBRATION EQUIPMENT

MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE	MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE
SAMIE	AS	S/N 4					

CALIBRATION DATA

	STD °K	STD °C	100/K	RT Ω	RATIO RT/98.816
MAR - 1 1966					
ICE				96.816	1.000000
MAR - 2 1966					
ICE				96.816	1.000000
CO_2	195.454	-77.696	0.511627	99.424	1.026938
LN_2	77.474	-195.676	1.290751	121.320	1.253099
LNe	27.070	-246.080	3.694127	183.840	1.898860
MAR - 3 1966					
ICE				96.820	1.000041
MAR - 7 1966					
ICE				96.840	1.000248
CRYOSTAT	77.446	-195.704	1.291222	121.256	1.252438
MAR - 8 1966					
CRYOSTAT	93.410	-179.740	1.070549	114.616	1.183854
	88.200	-184.950	1.133786	116.844	1.206867
	63.701	-209.449	1.569834	129.028	1.332714
	48.065	-225.085	2.080515	142.640	1.473310
	38.882	-234.268	2.571884	155.440	1.605520
	31.360	-241.790	3.188776	171.120	1.767476
	23.156	-249.994	4.318535	200.432	2.070236
	19.346	-253.804	5.169027	223.632	2.309866
MAR - 9 1966					
60°C	333.193	60.043	0.300126	97.080	1.002727
ICE				96.840	1.000248
Acceptable	per Dwg. 1126039 (Step 3) H.C. Clanton 15 Mar 66				

(CONTINUED ON REVERSE SIDE)

Element

S/N 6

LINEAR DATA RECORD

AGCS 0711-36

DATE FEB 15 1966

MANUFACTURER	MODEL NO.	SERIAL NO.	PROCEDURE NO.	TECHNICIAN
HERMETICS	1126039	6		

MANUFACTURER

MODEL NO.

CALIBRATION EQUIPMENT

MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE	MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE

CALIBRATION DATA

	STD °K	STD °C	100/K	RT Ω	RATIO RT/96.416
DEC 17 1965					
ICE				96.412	
ICE				96.416	
DEC 17 1965	27.436	-243.714	3.37725	175.536	1.820610
CRYOSTAT	25.782	-247.162	3.64801	181.224	1.938765
(	22.927	-250.221	4.36285	202.828	2.103675
	18.729	-254.422	5.33992	226.598	2.347612
)	16.302	-256.848	6.13436	250.360	2.59664
DEC 18 1965					
CRYOSTAT	37.528	-235.622	2.66459	156.40	1.626370
	40.322	-232.562	2.46375	151.376	1.570029
	45.206	-227.944	2.21209	144.712	1.502987
	52.195	-220.955	1.91570	137.268	1.423705
	63.155	-209.995	1.58340	128.428	1.332017
	78.787	-194.363	1.26926	119.928	1.245339
)	97.573	-175.577	1.02487	113.068	1.172709
DEC 20 1965					
CRYOSTAT	122.404	-150.746	0.816967	107.372	1.113632
ICE				96.440	
CO_2	194.642	-78.508	0.513763	97.312	1.009036
LN_2	77.472	-195.652	1.290360	120.664	1.251493
LNe	27.131	-246.019	3.685820	183.168	1.899767
ICE				96.436	
DEC 21 1965					
AMBIENT	294.963	21.313		96.450	1.000664
60°C	331.749	58.599	0.301432	96.536	1.001452
ICE				96.440	
Accept table	per dwg		1126039	(Sht 3)	[illegible] 9MAY.66

(CONTINUED ON REVERSE SIDE)

Element #

LINEAR DATA RECORD

AGCS 0711-36

DATE FEB 15 1966

MANUFACTURER	MODEL NO	SERIAL NO	PROCEDURE NO	TECHNICIAN
HERMETRICS	1126039	9		

CALIBRATION EQUIPMENT

MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE	MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE

CALIBRATION DATA

	STD °K	STD °C	100/K	RT Ω	RATIO RT/273.016	
DEC 17 1965						
ICE		0		97.016	1.000000	
ICE				97.016	1.000000	
DEC 17 1965	29.436	-243.714	3.39725	176.198	1.815659	
CRYOSTAT	25.788	-247.162	3.84801	187.508	1.932753	
	22.429	-250.721	4.45855	203.352	2.096067	
	18.727	-254.422	5.33942	227.304	2.342954	
	16.302	-256.848	6.13436	250.040	2.577307	
DEC 18 1965						
	37.528	-235.622	2.66459	157.452	1.622949	
	40.588	-232.562	2.46375	151.940	1.566133	
	45.206	-227.944	2.21209	145.496	1.499711	
	52.195	-220.955	1.91590	137.840	1.420797	
	63.155	-209.995	1.58340	128.988	1.329554	
	78.787	-194.363	1.269299	120.376	1.240785	
	97.573	-175.577	1.024873	113.520	1.170116	
DEC 20 1965						
CRYOSTAT	122.404	-150.746	0.816967	107.868	1.111858	
ICE				97.052		
CO_2	194.642	-78.508	0.513763	99.840	1.029109	
LN_2	77.498	-195.652	1.29036	121.056	1.247794	
LN_2	27.131	-246.019	3.685820	183.252	1.888554	
ICE				97.048		
DEC 21 1965						
AMBIENT	274.463	21.313		97.068	1.000639	
60°C	331.749	58.599	0.301432	97.156	1.001443	
ICE				97.052		
Acceptable per dwg 1126039			(Step 3)	H.C. Ch...		9 MAR 66

(CONTINUED ON REVERSE SIDE)

Element — GROUP CALIBRATION S/N 6 [illegible] 10

LINEAR DATA RECORD

AGCS 0711-36

DATE FEB 15 1966

MANUFACTURER	MODEL NO	SERIAL NO	PROCEDURE NO	TECHNICIAN
AEROMETRICS	1126037	10		R

CALIBRATION EQUIPMENT

MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE	MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE

CALIBRATION DATA

	STD °K	STD °C	100/K	RT Ω	RATIO RT/96.624	RATIO RT/96.660
DEC 17 1965						
ICE				96.624		
ICE				96.624		
DEC 17 1965						
CRYOSTAT	29.436	-243.714	3.31725	176.580	1.827496	
	25.988	-247.162	3.84801	187.952	1.745190	
	22.429	-250.721	4.45855	203.924	2.110490	
	18.729	-254.422	5.33942	228.128	2.360987	
	16.302	-256.848	6.13436	250.720	2.594386	
DEC 18 1965						
CRYOSTAT	37.528	-235.622	2.66459	157.628	1.631355	
	40.588	-232.562	2.46375	151.948	1.572570	
	45.206	-227.944	2.21209	145.440	1.505217	
	52.195	-220.955	1.91590	137.728	1.425402	
	63.155	-209.995	1.58340	128.832	1.333333	
	78.787	-194.363	1.26929	120.152	1.243500	
	97.573	-175.577	1.02487	113.288	1.172462	
DEC 20 1965						
CRYOSTAT	122.404	-150.746	0.816967	107.544	1.113015	1.112596
ICE				96.660		
CO_2	194.642	-78.508	0.513763	99.496	1.029724	1.029336
LN_2	77.498	-195.652	1.290360	120.960	1.251863	1.251392
LH_2	27.131	-246.019	3.685820	183.400	1.898079	1.897365
ICE				96.656		
DEC 21 1965						
AMBIENT	294.463	21.313		96.672	1.000497	1.000120
BOIL	331.749	58.599	0.301432	96.752	1.001325	1.000948
ICE				96.660		

Accuracy per chart 1126037 (Step 2) No deviation 9 Mar 66

(CONTINUED ON REVERSE SIDE)

GROUP CALIBRATION (SN 2, 5, 11, 12 & 19)

LINEAR DATA RECORD

AGCS 0711-36

P/O TI-100A-200

DATE: MAR 15 1966

MANUFACTURER	MODEL NO.	SERIAL NO	PROCEDURE NO	TECHNICIAN
ALLOMETRICS	112 6039	11		J. I. 7A308

CALIBRATION EQUIPMENT

MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE	MANUFACTURER	MODEL NO.	SERIAL NO	RECALL DATE
SAME	AS	S/N 4					

CALIBRATION DATA

	STD °K	STD °C	100/K	R_T Ω	RATIO $R_T/97.199$
MAR - 1 1966					
ICE				97.199	1.000000
MAR - 2 1966					
ICE				97.199	1.000000
CO_2	195.454	-77.696	0.511629	98.800	1.026759
LN_2	77.474	-195.676	1.290751	121.700	1.252070
LNe	27.070	-246.080	3.694127	184.728	1.900513
MAR - 3 1966					
ICE				97.204	1.000051
MAR - 7 1966					
ICE				97.220	1.000216
CRYOSTAT	77.446	-195.704	1.291222	121.708	1.252153
MAR - 8 1966					
CRYOSTAT	93.410	-179.740	1.070549	115.060	1.183757
	88.200	-184.950	1.133786	117.304	1.206843
	63.701	-209.499	1.569834	129.608	1.333429
	48.065	-225.085	2.080515	143.440	1.475735
	38.882	-234.268	2.571884	156.344	1.608994
	31.360	-241.790	3.188776	172.296	1.772611
	23.156	-249.994	4.318535	202.052	2.078746
	17.346	-253.804	5.169027	225.312	2.318049
MAR - 9 1966					
60°C	333.193	60.043	0.300126	97.448	1.002562
ICE				97.224	1.000257
Acceptable per dwg 1126039 (Step 3) H.C. Chan 15 Mar. 66					

(CONTINUED ON REVERSE SIDE)

GROUP CALIBRATION (SN 2, 5, 11, 12 + 19)

LINEAR DATA RECORD

AGCS 0711-36

P/O TI-100A-200

DATE MAR 19 1966

MANUFACTURER	MODEL NO	SERIAL NO	PROCEDURE NO	TECHNICIAN
ALLOMETRICS	1126039	12		R

CALIBRATION EQUIPMENT

MANUFACTURER	MODEL NO	SERIAL NO	RECALL DATE	MANUFACTURER	MODEL NO	SERIAL NO	RECALL DATE
SAME	AS	S/N 4					

CALIBRATION DATA

	STD °K	STD °C	100/K	RT Ω	RATIO RT/98.044	
MAR - 1 1966						
ICE				98.044	1.000000	
MAR - 2 1966						
ICE				98.044	1.000000	
CO_2	195.954	-77.696	0.511629	100.644	1.026519	
LN_2	77.474	-195.676	1.290751	122.376	1.248174	
LNe	27.070	-246.080	3.694127	185.028	1.887194	
MAR - 3 1966						
ICE				98.048	1.000041	
MAR - 7 1966						
ICE				98.080	1.000367	
CRYOSTAT	77.446	-195.704	1.291222	122.244	1.246828	
MAR - 8 1966						
CRYOSTAT	73.410	-179.740	1.070349	115.644	1.179511	
	88.200	-184.950	1.133786	117.880	1.202317	
	63.701	-209.449	1.569834	130.116	1.327118	
	48.065	-225.085	2.080515	143.860	1.467300	
	38.882	-234.268	2.571884	156.596	1.597201	
	31.360	-241.790	3.188776	172.404	1.758435	
	23.156	-249.994	4.318535	201.892	2.059198	
	19.346	-253.804	5.169027	224.820	2.293052	
MAR - 9 1966						
60 °C	333.193	60.043	0.300126	98.336	1.002978	
ICE				98.080	1.000367	
Acceptable per Dwg	1126039		(Step 3)	H.C. Clarke	15 Mar 66	

(CONTINUED ON REVERSE SIDE)

GROUP CALIBRATION (SN 2, 5, 11, 12 & 19)
P/O TI-1044-200

LINEAR DATA RECORD

AGCS 0711-36

DATE: MAR 15 1966

MANUFACTURER	MODEL NO	SERIAL NO	PROCEDURE NO	TECHNICIAN
AEROSTRICS	1126039	19		P

CALIBRATION EQUIPMENT

MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE	MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE
SAME	AS	S/N 4					

CALIBRATION DATA

	STD °K	STD °C	100/K	RT Ω	RATIO RT/97.763
MAR - 1 1966					
ICE				97.763	1.000000
MAR - 2 1966					
ICE				97.763	1.000000
CO_2	195.454	-77.696	0.511629	100.272	1.025664
LH_2	77.474	-195.676	1.290751	121.824	1.246116
LNe	27.070	-246.080	3.694127	184.200	1.884148
MAR 3 1966					
ICE				97.768	1.000051
MAR 7 1966					
ICE				97.800	1.000378
CRYOSTAT	77.446	-195.704	1.291222	121.684	1.244684
MAR 8 1966					
CRYOSTAT	93.390	-179.760	1.070778	115.088	1.177214
	88.561	-184.589	1.129165	117.356	1.200413
	63.806	-209.344	1.567230	129.516	1.324796
	48.076	-225.084	2.080039	143.160	1.464358
	38.882	-234.268	2.571884	155.728	1.592913
	31.360	-241.790	3.188776	171.440	1.753629
	23.156	-249.994	4.318535	200.712	2.053047
	19.396	-253.804	5.169027	223.600	2.287164
MAR 9 1966					
60°C	333.193	60.043	0.300126	98.020	1.002629
ICE				97.796	1.000338

Acceptable per dwg 1126039 (Sh. 5) H.C. Chan Con 15 Mar 66

(CONTINUED ON REVERSE SIDE)

GROUP CALIBRATION (SN 4, 22, 23, 24, 25)

LINEAR DATA RECORD

AGCS 0711-36

P/O T1-104A-200

DATE MAR 15 1966

MANUFACTURER	MODEL NO	SERIAL NO	PROCEDURE NO	TECHNICIAN
A[illegible]METRICS	1126039	22		RP

CALIBRATION EQUIPMENT

MANUFACTURER	MODEL NO	SERIAL NO	RECALL DATE	MANUFACTURER	MODEL NO	SERIAL NO	RECALL DATE
SAME	AS S/N 4						

CALIBRATION DATA

	STD °K	STD °C	100/K	RT Ω	RATIO RT/98.564	RATIO RT/98.600
MAR - 9 1966						
ICE				98.564	1.000000	
LN_2	77.519	-195.631	1.290001	124.244	1.260542	
ICE				98.564	1.000000	
CRYOSTAT	42.124	-231.673	2.373943	154.312	1.565603	
	37.785	-235.366	2.646552	161.616	1.639707	
	30.956	-242.195	3.230440	176.992	1.795708	
	26.471	-246.679	3.777661	191.548	1.943389	
	23.290	-249.860	4.293631	205.792	2.087904	
	19.295	-253.855	5.182689	230.568	2.339274	
	20.871	-252.279	4.791338	219.344	2.225398	
AMBIENT	295.440	22.290	0.338479	98.500		0.998986
ICE				98.600		1.000000
60°C	331.390	58.240	0.3017592	98.736		1.0013795
CO_2	194.689	-78.461	0.5136390	101.580		1.030223
ICE				98.600		1.000000
Acceptable per Dwg 1126039 (Sty 3) H.C. Chandler						15 March 66

(CONTINUED ON REVERSE SIDE)

GROUP CALIBRATION (SN 4, 22, 23, 24, 25)
P/O T1-104A-200

LINEAR DATA RECORD

AGCS 0711-36

DATE MAR 15 1966

MANUFACTURER	MODEL NO	SERIAL NO	PROCEDURE NO	TECHNICIAN
CRYOMETRICS	1126039	23		R ITT 76738

CALIBRATION EQUIPMENT

MANUFACTURER	MODEL NO	SERIAL NO	RECALL DATE
SAME AS S/N 4			

CALIBRATION DATA

	STD. °K	STD. °C	100/K	RT Ω	RATIO RT/96.520	RATIO RT/96.548
MAR - 9 1966						
ICE				96.520	1.000000	
LN_2	77.519	-195.631	1.290001	121.684	1.260768	
ICE				96.520	1.000000	
CRYOSTAT	42.124	-231.673	2.373943	151.280	1.567412	
	37.785	-235.366	2.646552	158.444	1.641638	
	30.956	-242.195	3.230440	173.504	1.797675	
	26.471	-246.679	3.777661	187.844	1.946252	
	23.290	-249.860	4.293631	201.820	2.091057	
	19.295	-253.855	5.182689	226.388	2.345606	
	20.871	-252.279	4.791338	215.136	2.229024	
AMBIENT	295.440	22.290	0.338479	96.452	0.999295	
ICE				96.548		1.000000
60°C	331.390	58.240	0.3017592	96.664		1.001197
CO_2	194.689	-78.461	0.5136390	99.476		1.030323
ICE				96.552		1.000037

Acceptable per dwg 1126039 (step 3) H.C. Chandler 15 Mar 66

(CONTINUED ON REVERSE SIDE)

GROUP CALIBRATION (SN 4, 22, 23, 24, & 25)
P/O TI-104A-200

LINEAR DATA RECORD

AGCS 0711-36

DATE MAR 15 1966

MANUFACTURER	MODEL NO	SERIAL NO	PROCEDURE NO	TECHNICIAN
[illegible]ROMETRICS	1126039	24		R

CALIBRATION EQUIPMENT

MANUFACTURER	MODEL NO	SERIAL NO	RECALL DATE	MANUFACTURER	MODEL NO	SERIAL NO	RECALL DATE
SAME	AS	S/N 4					

CALIBRATION DATA

	STD °K	STD °C	100/K	RT Ω	RATIO RT/98.424	
MAR - 9 1966						
ICE				98.424	1.000000	
LN_2	77.519	-195.631	1.290001	123.840	1.258227	
ICE				98.424	1.000000	
CRYOSTAT	42.124	-231.673	2.373743	153.800	1.562623	
	37.785	-235.366	2.646562	161.040	1.636183	
	30.956	-242.195	3.230490	176.240	1.790616	
	26.471	-246.679	3.777661	190.716	1.937694	
	23.290	-249.860	4.293631	204.800	2.080788	
	19.295	-253.855	5.182689	229.632	2.333084	
	20.871	-252.279	4.791338	218.400	2.218966	
AMBIENT	295.440	22.290	0.338479	98.276	0.998494	
ICE				98.424	1.000000	
60°C	331.390	58.290	0.3017592	98.484	1.000607	
CO_2	194.689	-78.461	0.5136390	101.304	1.029259	
ICE				98.428	1.000038	

Acceptable per dwg 1126039 (sht 3) H. C. Chandler 15 Mar 66

(CONTINUED ON REVERSE SIDE)

GROUP CALIBRATION (SN 4, 22, 23, 24, & 25)

LINEAR DATA RECORD

AGCS 0711-36

P/O TI-104A-200

DATE MAR 15 1966

MANUFACTURER	MODEL NO.	SERIAL NO	PROCEDURE NO	TECHNICIAN
AEROMETRICS	1126039	25		R

CALIBRATION EQUIPMENT

MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE	MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE
SAME	AS	S/N 4					

CALIBRATION DATA

	STD °K	STD °C	100/K	RT Ω	RATIO RT/98.096	RATIO RT/98.192
MAR - 9 1966						
ICE				98.096	1.000000	
LN_2	77.519	-195.631	1.290001	123.244	1.256349	
ICE				98.096	1.000000	
CRYOSTAT	42.124	-231.673	2.373943	152.568	1.555278	
	37.785	-235.366	2.646552	159.620	1.627166	
	30.956	-242.195	3.230440	174.516	1.779016	
	26.471	-246.679	3.777661	188.648	1.923078	
	23.290	-249.860	4.293631	203.304	2.072481	
	19.295	-253.855	5.182689	226.524	2.309186	
	20.871	-252.279	4.791338	215.920	2.201088	
AMBIENT	295.440	22.290	0.338479	98.044	0.999461	
ICE				98.192		1.000000
60°C	331.390	58.240	0.301668	98.276		1.000843
CO_2	199.689	-78.461	0.5136390	101.040		1.028991
ICE				98.188		0.999947
Acceptable per Dwg 1126039 (Step 3)				H.C. Chandler	15 Mar 66	

(CONTINUED ON REVERSE SIDE)

Enclosure 6
0700:1161

AEROMETRICS

TEST PROCEDURE 7905-007

AEROMETRICS TEST PROCEDURE 7905-007

ACCEPTANCE TEST PROCEDURE FOR

MODEL T1 104A-200

TEMPERATURE TRANSDUCER

CONTRACT NO. NAS 8-11862

28 MARCH 1966

APPROVALS:

Project Engineer

Quality Control Manager

APPROVED FOR:

NASA Representative

ACCEPTANCE TEST PROCEDURE FOR TEMPERATURE TRANSDUCER MODEL T1 104A-200

1. PURPOSE

To demonstrate compliance with the requirements of NASA Contract NAS 8-11862

2. TEST PROCEDURE

Step 1. ELECTRICAL CONTINUITY TEST

Measure and record the electrical resistance at ambient temperature (72 $\pm$5°F), between the blue and black terminal; red and blue terminal; and tan and black terminal. The resistance limits shall be as follows:

Blue to black - Between 95 and 105 ohms
Red to Blue - Between 6 and 10 ohms
Tan to Black - Between 9 and 14 ohms

Step 2. INSULATION TEST

Measure and record the insulation resistance between the red terminal and the housing at ambient temperature (72 $\pm$5°F). The resistance shall be greater than 10 Megohms when measured with 50 VDC potential. All surfaces are to be dry and free from moisture.

Step 3. CALIBRATION

Using the circuit shown in Figure 1, calibrate each transducer in fixed baths of ice/water, carbon dioxide, liquid nitrogen, and liquid neon. Calibrate each transducer in an adjustable temperature bath at 60 $\pm$5°C.

Step 4. RESPONSE TEST

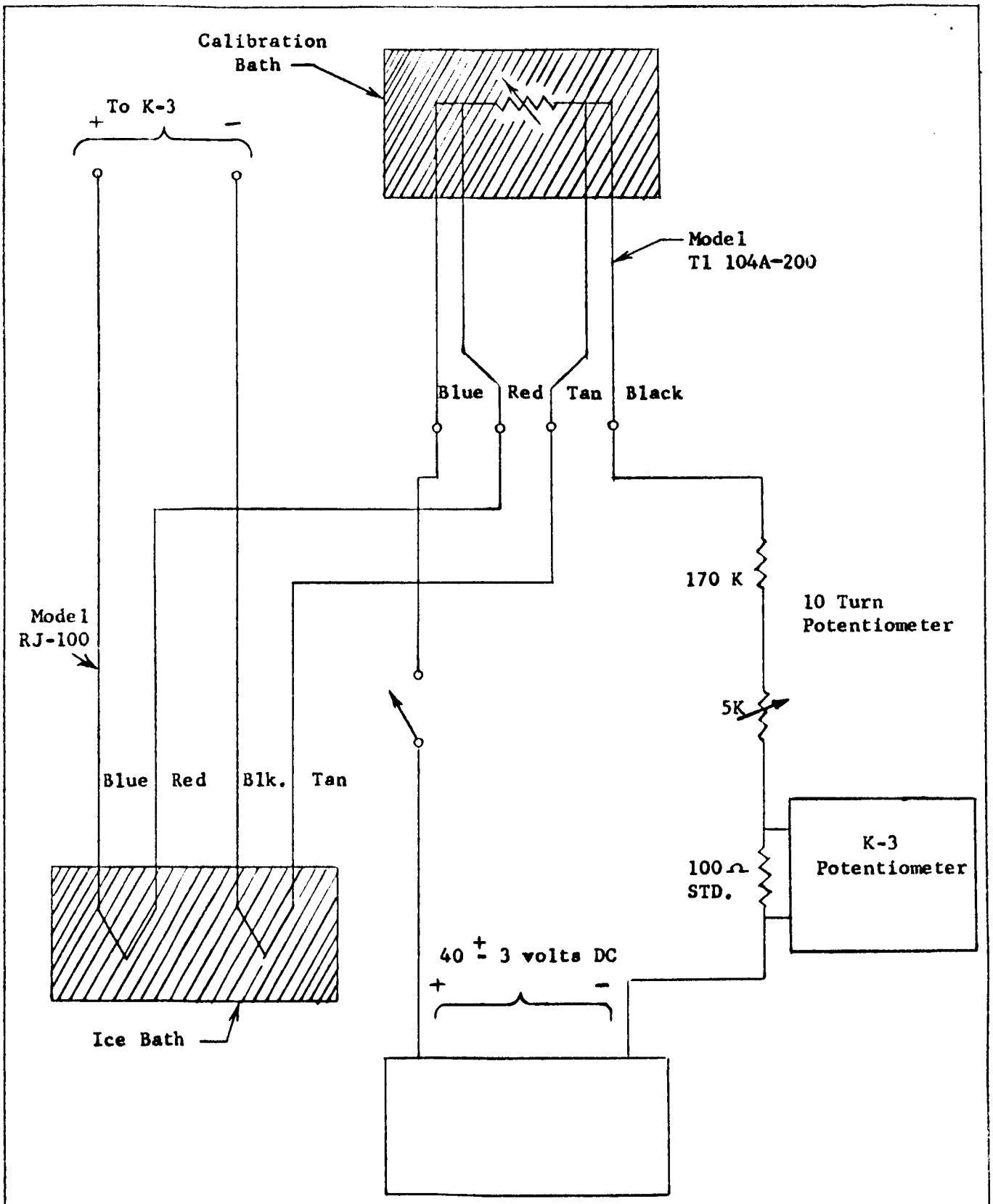
Using the setup per Figure 2 and circuit per Figure 3, measure and record the one time constant (63%) response for a change in the output signal for temperature changes from -196°C to -246°C and -246°C to -196°C. The average of two cycles shall not exceed 0.25 seconds.

Step 5. POST ELECTRICAL CONTINUITY TEST

Repeat Step 1.

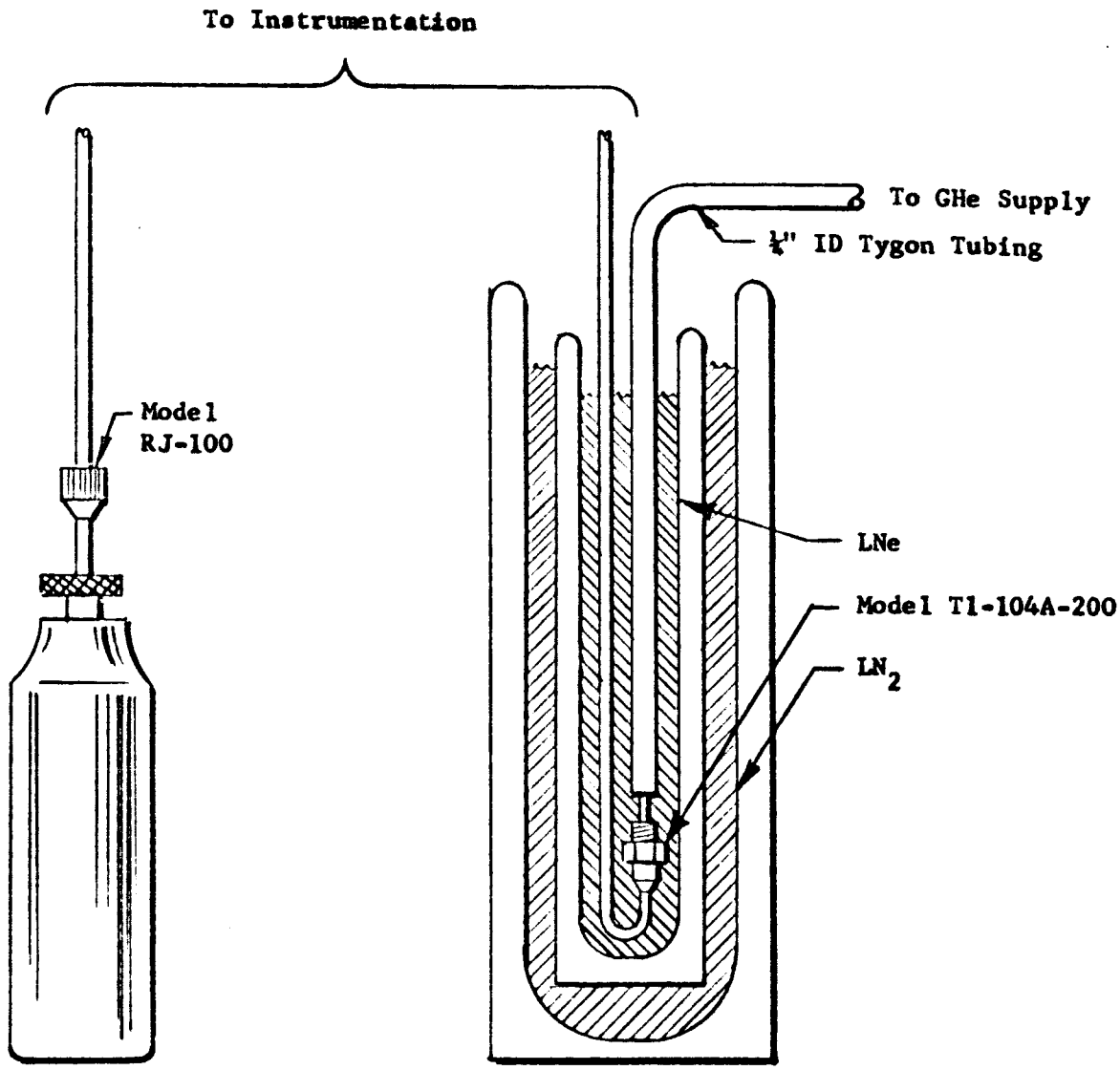
Step 6. POST INSULATION TEST

Repeat Step 2.



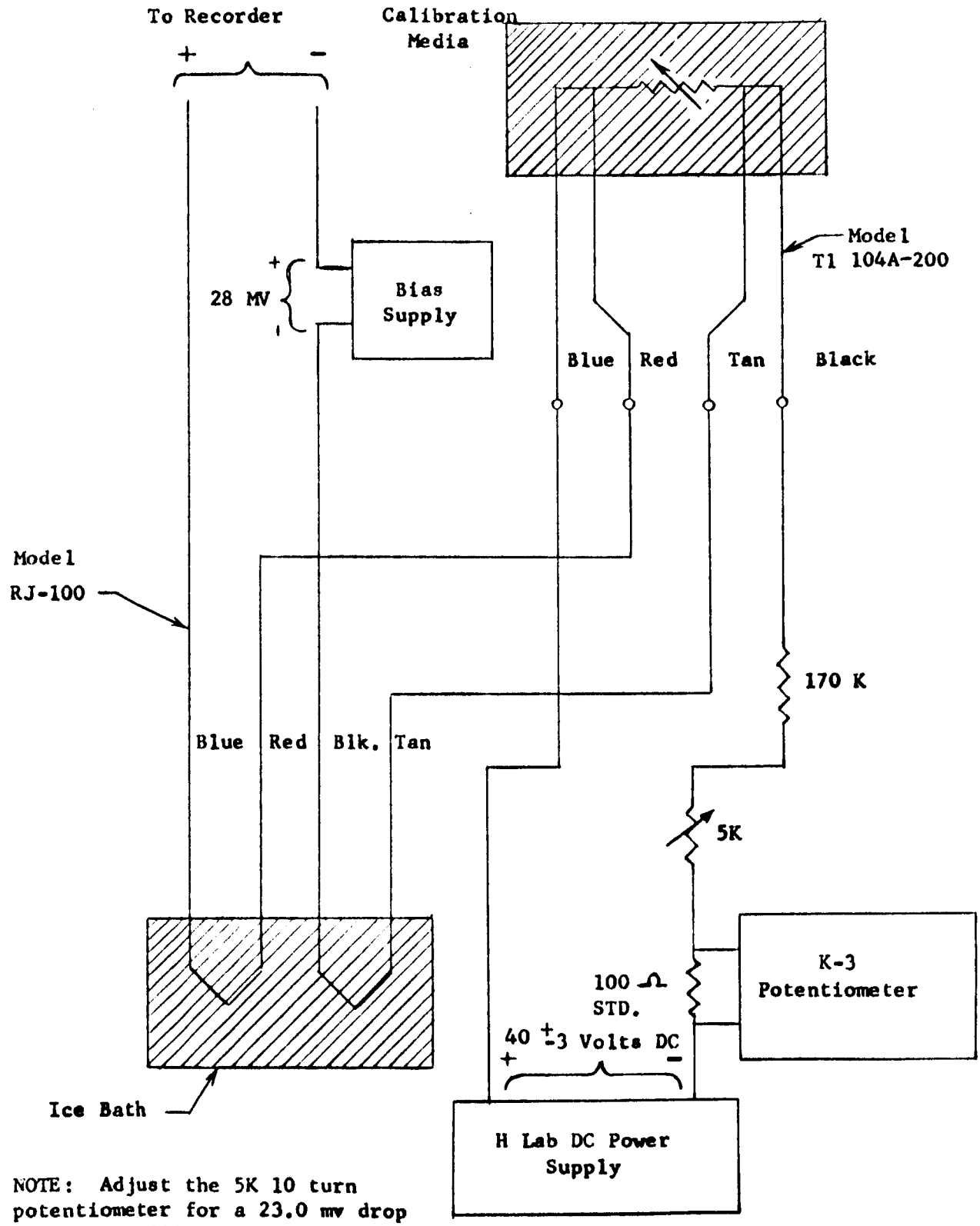
NOTE: Adjust the 5K 10 turn potentiometer for a 23.0 mv drop across the 100 Ω .Std.

CALIBRATION CIRCUIT FIGURE - 1



RESPONSE TEST SETUP

FIGURE - 2



NOTE: Adjust the 5K 10 turn potentiometer for a 23.0 mv drop across the 100 Ω Std.

RESPONSE TEST CIRCUIT

FIGURE - 3

Enclosure 7
0700:1161

ACCEPTANCE TEST DATA

FOR 13 PRODUCTION TRANSDUCERS

CALIBRATION DATA SHEET

AEC 3-036-008

DATE 23 MARCH 66

MANUFACTURER	MODEL NO.	SERIAL NO	PROCEDURE NO	TECHNICIAN
KOMETRICS	TI-104A-200	AS NOTED	ATP 7905-007	RJ 7A 308

CALIBRATION EQUIPMENT

MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE	MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE
LEA	4232-B	1573937	23 Aug 1966				
LEA	9835-B	1546482	27 OCT 1966				

CALIBRATION DATA

PROC. STEP NO. (1)	FUNCTION TESTED (2)	READING OR VALUE NOMINAL (3)	READING OR VALUE MEASURED (4)	CORRECTED VALUE OF COLUMN ____ (5)	✓ CHECK ONE: DEVIATION / CORRECTION / ERROR / ACTUAL VALUE (6)	CALIBRATION TOLERANCES LOWER LIMIT (7)	CALIBRATION TOLERANCES UPPER LIMIT (8)
	STEP 1.	ELECTRICAL	CONTINUITY			TEST	
		SN	BLUE BLACK	RED BLUE	TAN BLACK		
			95 min	6 min	9 min	SPECIFICATION	
			105 max	10 max	14 max	LIMITS	
		2	97.2 Ω	8.0 Ω	10.6 Ω		
		4	101.2	7.9	10.4		
		5	95.9	7.8	10.6		
		6	98.8	8.0	10.5		
		9	97.8	7.9	10.7		
		10	97.4	7.9	10.5		
		11	96.0	7.9	10.6		
		12	97.8	7.5	10.5		
		19	97.4	8.0	10.6		
		22	99.3	8.4	10.7		
		23	97.2	7.8	10.6		
		24	98.0	7.9	10.6		
		25	97.6	7.8	10.6		
		All reading are acceptable				N.O. Chamberlain 23 March 1966	

(CONTINUED ON REVERSE SIDE)

CALIBRATION DATA SHEET

ASC 3-026-005

DATE 23 MARCH 66

MANUFACTURER	MODEL NO.	SERIAL NO.	PROCEDURE NO.	TECHNICIAN
ROMETRICS	TI-104A-200	As Noted	ATP 7905-007	R.A.T.

CALIBRATION EQUIPMENT

MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE
WEC	799	1512	15 Sept 1966

CALIBRATION DATA

PROC. STEP NO. (1)	FUNCTION TESTED (2)	READING OR VALUE NOMINAL (3)	READING OR VALUE MEASURED (4)	CORRECTED VALUE OF COLUMN ____ (5)	✓ CHECK ONE: DEVIATION / CORRECTION / ERROR / ACTUAL VALUE (6)	CALIBRATION TOLERANCES LOWER LIMIT (7)	CALIBRATION TOLERANCES UPPER LIMIT (8)
	STEP 2.		INSULATION TEST				
		SN	RED CASE				
			10 Meg min				
		2	>10,000 Meg ohms				
		4	>10,000				
		5	>10,000				
		6	>10,000				
		9	>10,000				
		10	>10,000				
		11	>10,000				
		12	>10,000				
		19	>10,000				
		22	>10,000				
		23	>10,000				
		24	>10,000				
		25	>10,000				
	All readings are acceptable				H. C. Okamura		
					23 March 1966		

(CONTINUED ON REVERSE SIDE)

STEP 3 CALIBRATION PAGE 3 of 11

$\frac{1}{123} = 4.347826086$

CALIBRATION DATA SHEET

DATE 23 MARCH 1966

MANUFACTURER	MODEL NO	SERIAL NO	PROCEDURE NO	TECHNICIAN
AEROMETRICS	TI-104A-200	As Noted	ATP 7905-007	R

CALIBRATION EQUIPMENT

MANUFACTURER	MODEL NO	SERIAL NO	RECALL DATE	MANUFACTURER	MODEL NO	SERIAL NO	RECALL DATE
LEA	7559	1544791	3 Aug 1966				
EPA	100	702608	10 May 1966				
LEA	7553	1208515	17 June 1966				

CALIBRATION DATA

PROC STEP NO (1)	FUNCTION TESTED (2)	READING OR VALUE NOMINAL (3)	READING OR VALUE MEASURED (4)	CORRECTED VALUE OF COLUMN ___ (5)	✓ CHECK ONE: DEVIATION / CORRECTION / ERROR / ACTUAL VALUE (6)	CALIBRATION TOLERANCES LOWER LIMIT (7)	CALIBRATION TOLERANCES UPPER LIMIT (8)
	ICE POINT CALIBRATION						
				OUTPUT (mV)			
	SN			← no excitation →	← I_e = 0.2300 ma →		
				no load	100K load	no load	100K load
	2			-0.005	-0.005	22.453	22.438
	4			-0.003	-0.003	23.112	23.092
○	5			-0.006	-0.006	22.344	22.324
	6			-0.005	-0.005	22.620	22.606
	9			-0.003	-0.003	22.380	22.352
	10			-0.001	-0.001	22.294	22.266
	11			-0.003	-0.003	21.935	21.909
	12			-0.004	-0.004	22.380	22.350
	19			-0.003	-0.003	22.280	22.253
	22			-0.003	-0.003	22.717	22.689
	23			-0.004	-0.004	22.665	22.635
	24			-0.004	-0.004	22.533	22.507
	25			-0.005	-0.005	22.799	22.759
	All readings are acceptable H. C. Chandler 24 March 1966						
			Av.	-0.0038	-0.0038		

CALIBRATION DATA SHEET

MANUFACTURER	MODEL NO	SERIAL NO	PROCEDURE NO	TECHNICIAN	DATE
○					

CALIBRATION EQUIPMENT

MANUFACTURER	MODEL NO	SERIAL NO	RECALL DATE	MANUFACTURER	MODEL NO	SERIAL NO	RECALL DATE

CALIBRATION DATA

PROC STEP NO (1)	FUNCTION TESTED (2)	READING OR VALUE NOMINAL (3)	READING OR VALUE MEASURED (4)	CORRECTED VALUE OF COLUMN ___ (5)	✓ CHECK ONE: DEVIATION / CORRECTION / ERROR / ACTUAL VALUE (6)	CALIBRATION TOLERANCES LOWER LIMIT (7)	CALIBRATION TOLERANCES UPPER LIMIT (8)
R_o	← Calculated	R_o →	$R_s(100K)$				
10 cycle	(7)/.23	(8)/.23	$R_o + 100K$				
average	~	~	~		(7) - (8)		
no load	no load	100K load	(Equiv.)		mv		
96.974	97.6217	97.5565	97.5265	✓	0.015		
98.274	100.4870	100.4000	100.3865	✓	0.020		
9[illegible]	97.1478	97.0609	97.0536	✓	0.020		
	98.3478	98.2870	98.2512	✓	0.014		
97.500	97.3043	97.1826	97.2097	✓	0.028		
97.214	96.9304	96.8087	96.8366	✓	0.028		
96.838	95.3696	95.2565	95.2787	✓	0.026		
97.522	97.3043	97.1739	97.2097	✓	0.030		
97.216	96.8696	96.7522	96.7758	✓	0.027		
98.449	98.7696	98.6478	98.6721	✓	0.028		
96.645	98.5435	98.4130	98.4465	✓	0.030		
98.380	97.9696	97.8565	97.8737	✓	0.025		
98.157	99.1261	98.9522	99.0280	✓	0.040		

CALIBRATION DATA SHEET

ABC 3-089-005 DATE 23 MARCH 1966

MANUFACTURER	MODEL NO	SERIAL NO	PROCEDURE NO	TECHNICIAN
CZOMETRICS	TI-104A-200	As Noted	ATP 7905-007	[illegible]

CALIBRATION EQUIPMENT

MANUFACTURER	MODEL NO	SERIAL NO	RECAL DATE
RCH	162 D	169	29 March 66

} all other equipment same as page 6 of 11

(amp = -10.000091)

CALIBRATION DATA

PROC STEP NO (1)	FUNCTION TESTED (2)	READING OR VALUE NOMINAL (3)	READING OR VALUE MEASURED (4)	CORRECTED VALUE OF COLUMN (5)	✓ CHECK ONE: DEVIATION / CORRECTION / ERROR / ACTUAL VALUE (6)	CALIBRATION TOLERANCES LOWER LIMIT (7)	CALIBRATION TOLERANCES UPPER LIMIT (8)
	LN2 POINT	MUELLER STD Ω	Temp.	no	OUTPUT (mv) excitation	I_e = 0.2304 ma	
	SN			no load	100K load	no load	100K load
2	N	4.8167	77.4236°K −195.724°C	8.664	8.650	36.652	36.599
	R	4.8084	−320.304°F				
4	N	4.8163	77.421°K −195.732°C	8.663	8.649	37.607	37.549
	R	4.8077	−320.312°F				
5	N	4.8160	77.418°K −195.732°C	8.664	8.649	36.217	36.162
	R	4.8073	−320.319°F				
6	N	4.8222	77.471°K −195.679°C	8.647	8.634	36.872	36.812
	R	4.8130	−320.222°F				
9	N	4.8164	77.421°K −195.729°C	8.668	8.653	36.783	36.723
	R	4.8077	−320.312°F				
10	N	4.8167	77.427°K −195.723°C	8.662	8.647	36.663	36.606
	R	4.8084	−320.304°F				
11	N	4.8163	77.417°K −195.733°C	8.671	8.653	36.110	36.060
	R	4.8070	−320.319°F				
12	N	4.8163	77.418°K −195.732°C	8.666	8.650	36.706	36.658
	R	4.8072	−320.317°F				
19	N	4.8160	77.418°K −195.732°C	8.663	8.649	36.584	36.530
	R	4.8075	−320.317°F				
22	N	4.8167	77.426°K −195.724°C	8.665	8.651	37.352	37.300
	R	4.8084	−320.304°F				
23	N	4.8167	77.426°K −195.724°C	8.647	8.632	36.733	36.673
	2	4.8084	−320.304°F				
24	N	4.8163	77.417°K −195.733°C	8.667	8.653	36.887	36.833
	R	4.8070	−320.319°F				
25	N	4.8222	77.471°K −195.679°C	8.647	8.635	36.622	36.563
	R	4.8130	−320.222°F				

All readings are time table H.C. Hudson 24 March 1966

CONTINUED ON REVERSE SIDE

CALIBRATION DATA SHEET

ABC 3-089-005 DATE

MANUFACTURER	MODEL NO	SERIAL NO	PROCEDURE NO	TECHNICIAN

CALIBRATION EQUIPMENT

MANUFACTURER	MODEL NO	SERIAL NO	RECAL DATE

CALIBRATION DATA

PROC STEP NO (1)	FUNCTION TESTED (2)	READING OR VALUE NOMINAL (3)	READING OR VALUE MEASURED (4)	CORRECTED VALUE OF COLUMN (5)	✓ CHECK ONE: DEVIATION / CORRECTION / ERROR / ACTUAL VALUE (6)	CALIBRATION TOLERANCES LOWER LIMIT (7)	CALIBRATION TOLERANCES UPPER LIMIT (8)
	Aerometric's	Dev (mv)	Dev (mv)			(7) − (8)	
	TC (mv) STD.	STD − no load	STD − 100K load			mv	
	8.709	0.045	0.059	[illegible]	✓	0.53	
	8.710	0.047	0.061	[illegible]	✓	0.58	
	8.710	0.047	0.061	[illegible]	✓	0.55	
	8.708	0.061	0.074	[illegible]	✓	0.60	
	8.710	0.042	0.057	[illegible]	✓	0.60	
	8.709	0.047	0.062	[illegible]	✓	0.57	
	8.710	0.039	0.057	[illegible]	✓	0.40	
	8.710	0.044	0.060	[illegible]	✓	0.48	
	8.710	0.047	0.061	[illegible]	✓	0.54	
	8.709	0.044	0.058	[illegible]	✓	0.52	
	8.709	0.062	0.077	[illegible]	✓	0.60	
	8.710	0.043	0.057	[illegible]	✓	0.54	
	8.708	0.061	0.073	[illegible]	✓	0.59	
−195.721°C av.		0.0484	0.0628				

(CONTINUED ON REVERSE SIDE)

CALIBRATION DATA SHEET

DATE 24 MARCH 1966

MANUFACTURER	MODEL NO	SERIAL NO	PROCEDURE NO	TECHNICIAN
OROMETRICS	TI-104A-200	As Noted	ATP 7905-007	RD

CALIBRATION EQUIPMENT

MANUFACTURER	MODEL NO	SERIAL NO	NEXT CAL DATE
ROH	162D	169	29 March 66

all other equipment same as page 6 of 11

CONR = 0.000092

CALIBRATION DATA

PROC STEP NO (1)	FUNCTION TESTED (2)		READING OR VALUE NOMINAL (3)	READING OR VALUE MEASURED (4)	CORRECTED VALUE OF COLUMN (5)	CHECK ONE: DEVIATION / CORRECTION / ERROR / ACTUAL VALUE (6)	CALIBRATION TOLERANCES LOWER LIMIT (7)	CALIBRATION TOLERANCES UPPER LIMIT (8)
LNe POINT	Mueller				← Output (mv) No excitation		I_c = 0.2300 ma →	
SN					no load	100K load	no load	100K load
2	N	0.3186	27.134°K −246.016°C		9.630	9.605	52.057	51.954
	E	0.3085	−410.830°F					
4	N	0.3186	27.134°K −246.016°C		9.624	9.601	52.769	53.640
	R	0.3085	−410.830°F					
5	N	0.3181	27.139°K −246.011°C		9.623	9.602	51.283	51.183
	R	0.3094	−410.820°F					
6	N	0.3184	27.135°K −246.015°C		9.628	9.605	52.617	52.500
	R	0.3088	−410.827°F					
9	N	0.3181	27.131°K −246.019°C		9.630	9.606	52.206	52.095
	R	0.3088	−410.834°F					
10	N	0.3186	27.134°K −246.016°C		9.622	9.602	52.119	52.059
	E	0.3085	−410.830°F					
11	N	0.3181	27.139°K −246.011°C		9.630	9.608	51.275	51.165
	R	0.3094	−410.820°F					
12	N	0.3181	27.139°K −246.011°C		9.623	9.603	52.013	51.901
	R	0.3094	−410.820°F					
19	N	0.3181	27.139°K −246.011°C		9.623	9.602	51.867	51.759
	R	0.3094	−410.820					
22	N	0.3181	27.139°K −246.011°C		9.630	9.605	53.178	53.058
	R	0.3094	−410.820°F					
23	N	0.3187	27.134°K −246.016°C		9.626	9.603	52.442	52.326
	R	0.3084	−410.830°F					
24	N	0.3179	27.135°K −246.015°C		9.626	9.604	52.509	52.398
	R	0.3084	−410.827°F					
25	N	0.3181	27.139°K −246.011°C		9.620	9.599	51.949	51.839
	R	0.3094	−410.820°F					

All readings are acceptable. H.C. Chandler 24 March 1966

CALIBRATION DATA SHEET

DATE

MANUFACTURER	MODEL NO	SERIAL NO	PROCEDURE NO	TECHNICIAN

CALIBRATION EQUIPMENT

CALIBRATION DATA

PROC STEP NO (1)	FUNCTION TESTED (2)	READING OR VALUE NOMINAL (3)	READING OR VALUE MEASURED (4)	CORRECTED VALUE OF COLUMN (5)	CHECK ONE: DEVIATION / CORRECTION / ERROR / ACTUAL VALUE (6)	CALIBRATION TOLERANCES LOWER LIMIT (7)	CALIBRATION TOLERANCES UPPER LIMIT (8)
	Aerometrics	Dev (mv)	Dev (mv)	100/K		(7) − (8)	
	TC(mv) STD	STD − no load	STD − 100K load			mv	
	9.665	0.035	0.060	3.6[illegible]54[illegible]	✓	0.103	
	9.665	0.041	0.064	3.6[illegible]54[illegible]	✓	0.129	
	9.665	0.042	0.063	3.6[illegible]54[illegible]	✓	0.100	
	9.665	0.037	0.060	3.6[illegible]5277	✓	0.117	
	9.665	0.035	0.059	3.6[illegible]	✓	0.111	
	9.665	0.043	0.063	3.6[illegible]	✓	0.060	
	9.665	0.035	0.057	3.6[illegible]	✓	0.110	
	9.665	0.042	0.062	3.6[illegible]	✓	0.112	
	9.665	0.042	0.063	3.6[illegible]	✓	0.108	
	9.665	0.035	0.060	3.6[illegible]	✓	0.120	
	9.665	0.039	0.062	3.6[illegible]	✓	0.116	
	9.665	0.039	0.061	3.6[illegible]	✓	0.111	
	9.665	0.045	0.066	3.6[illegible]	✓	0.110	
	−246.014°C mv	0.0392	0.0615				

CALIBRATION DATA SHEET

ASC 3-089-005 DATE 24 MARCH 1966

MANUFACTURER	MODEL NO	SERIAL NO	PROCEDURE NO	TECHNICIAN
RANGE RISE	TJ-104A-500	No Number	ATP 7905-007	R

CALIBRATION EQUIPMENT

MANUFACTURER	MODEL NO	SERIAL NO	RECALL DATE	MANUFACTURER	MODEL NO	SERIAL NO	RECALL DATE
LEA	8163	1619839	17Aug1967				
LEA	8069B	1564785	17Feb1967				
LEA	9835	1569152	3Sept1966				
LEA	7559	1544791	3Aug1966				
EPA	100	70260B	10May1966	Comp -	0.000188		
LEA	7553	1208515	17June1966				

CALIBRATION DATA

PROC STEP NO (1)	FUNCTION TESTED (2)	READING OR VALUE NOMINAL (3)	READING OR VALUE MEASURED (4)	CORRECTED VALUE OF COLUMN (5)	✓ CHECK ONE: DEVIATION / CORRECTION / ERROR / ACTUAL VALUE (6)	CALIBRATION TOLERANCES LOWER LIMIT (7)	CALIBRATION TOLERANCES UPPER LIMIT (8)
	66°C FURNACE Mueller			← Output (mv)		TC = 0.2300 mv	
	SN °C	Sv	°F	no excitation			
				no load	100K load	no load	100K load
2	56.733 Av.	31.2132	134.019	-3.372	-3.370		
	56.806 Av.	31.2207	134.251			18.899	18.873
4	57.342 Av.	31.2740	135.216	-3.379	-3.377		
	57.142 Av.	31.2540	134.855			19.909	19.879
5	60.361 Av.	31.5755	140.650	-3.707	-3.705		
	60.392 Av.	31.5785	140.706			18.388	18.365
6	56.807 Av.	31.2205	134.253	-3.423	-3.420		
	56.762 Av.	31.2160	134.172			19.340	19.314
9	56.461 Av.	31.1861	133.630	-3.402	-3.400		
	56.772 Av.	31.2170	134.190			19.630	19.603
10	56.401 Av.	31.1900	133.522	-3.342	-3.340		
	56.732 Av.	31.2150	134.118			19.011	18.955
11	57.203 Av.	31.2601	134.965	-3.299	-3.307		
	57.233 Av.	31.2631	135.019			18.767	18.743
12	56.266 Av.	31.1665	133.279	-3.405	-3.398		
	55.876 Av.	31.1275	132.577			19.073	19.050
19	60.458 Av.	31.5851	140.824	-3.713	-3.710		
	60.442 Av.	31.5835	140.796			18.704	18.681
22	60.417 Av.	31.5810	140.751	-3.692	-3.690		
	60.457 Av.	31.5850	140.823			19.134	19.111
23	56.391 Av.	31.1790	133.504	-3.375	-3.372		
	56.301 Av.	31.1700	133.342			18.938	18.911
24	56.983 Av.	31.2381	134.569	-3.351	-3.349		
	57.063 Av.	31.2461	134.713			19.150	19.152
25	56.444 Av.	31.2021	133.599	-3.446	-3.443		
	56.933 Av.	31.2511	134.479			18.996	18.971

(CONTINUED ON REVERSE SIDE)

CALIBRATION DATA SHEET

ASC 3-089-005 DATE

MANUFACTURER	MODEL NO	SERIAL NO	PROCEDURE NO	TECHNICIAN

CALIBRATION EQUIPMENT

MANUFACTURER	MODEL NO	SERIAL NO	RECALL DATE	MANUFACTURER	MODEL NO	SERIAL NO	RECALL DATE

CALIBRATION DATA

PROC STEP NO (1)	FUNCTION TESTED (2)	READING OR VALUE NOMINAL (3)	READING OR VALUE MEASURED (4)	CORRECTED VALUE OF COLUMN (5)	✓ CHECK ONE: DEVIATION / CORRECTION / ERROR / ACTUAL VALUE (6)	CALIBRATION TOLERANCES LOWER LIMIT (7)	CALIBRATION TOLERANCES UPPER LIMIT (8)
	Aerometrics	Dev. (mv)	Dev. (mv)		(7) - (8)		
	TC (mv) STD	STD - no load	STD - 100K load		mv		
	-3.470	-0.098	-0.100	✓			
					-0.026		
	-3.513	-0.134	-0.136	✓			
					-0.030		
	-3.706	+0.001	-0.001	✓			
					-0.023		
	-3.488	-0.065	-0.068	✓			
					-0.026		
	-3.421	-0.019	-0.021	✓			
					-0.027		
	-3.452	-0.110	-0.112	✓			
					-0.016		
	-3.494	-0.195	-0.187	✓			
					-0.024		
	-3.444	-0.039	-0.046	✓			
					-0.023		
	-3.712	+0.001	-0.002	✓			
					-0.023		
	-3.710	-0.018	-0.020	✓			
					-0.023		
	-3.452	-0.077	-0.080	✓			
					-0.027		
	-3.490	-0.139	-0.141	✓			
					-0.028		
	-3.455	-0.009	-0.012	✓			
	57.562°C ave.	-0.0693	-0.0712		-0.025		

(CONTINUED ON REVERSE SIDE)

CALIBRATION DATA SHEET

DATE 24 March 1966

MANUFACTURER	MODEL NO	SERIAL NO	PROCEDURE NO	TECHNICIAN
Aerometrics	TC-104H-300	[illegible]	ATP 7905-007	R

CALIBRATION EQUIPMENT

LEA	B163	1557859	19Oct 1966				
} all other equipment same as page 6 of 11				CORR = 0.000159			

CALIBRATION DATA

PROC STEP NO (1)	FUNCTION TESTED (2)	READING OR VALUE NOMINAL (3)	READING OR VALUE MEASURED (4)	CORRECTED VALUE OF COLUMN (5)	✓ CHECK ONE: DEVIATION / CORRECTION / ERROR / ACTUAL VALUE (6)	CALIBRATION TOLERANCES LOWER LIMIT (7)	CALIBRATION TOLERANCES UPPER LIMIT (8)
CC Point	Voltage			Output (mV)		TC = 0.2300 mv	
1	~			NC load	NC load	VC load	100K load
2	N	17.4629	194.952°K	4.202	4.199	27.131	27.097
	R	17.4645	-78.308 °C				
			-108.959 °F				
4	N	17.4737	194.936 °K	4.195	4.188	27.918	27.882
	R	17.4743	-78.214 °C				
			-108.785 °F				
5	Av	17.4320	194.539 °K	4.176	4.168	26.743	26.708
			-78.616 °C				
			+109.509 °F				
6	N	17.4637	194.837 °K	4.198	4.192	27.393	27.356
	R	17.4637	-78.313 °C				
			-108.963 °F				
9	N	17.4685	194.887 °K	4.215	4.205	27.276	27.237
	R	17.4693	-78.263 °C				
			-108.873 °F				
10	N	17.4692	194.842 °K	4.200	4.194	27.170	27.133
	R	17.4694	-78.308 °C				
			-108.959 °F				
11	Av	17.4320	194.539 °K	4.177	4.169	26.675	26.637
			-78.616 °C				
			-109.509 °F				
12	N	17.4625	194.525 °K	4.201	4.194	27.221	27.186
	R	17.4625	-78.325				
			-108.985 °F				
19	Av	17.4320	194.539 °K	4.191	4.186	27.087	27.050
			-78.616 °C				
			-109.509 °F				
22	Av	17.4318	194.532 °K	4.166	4.160	27.561	27.524
			-78.618 °C				
			-109.512 °F				
23	N	17.4583	194.785 °K	4.204	4.197	27.177	27.139
	R	17.4582	-78.365				
			-109.057 °F				
24	Av	17.4319	194.531 °K	4.183	4.175	27.242	27.210
			-78.619 °C				
			-109.510 °F				
25	Av	17.4318	194.532 °K	4.193	4.189	27.156	27.121
			-78.618 °C				
			-109.512 °F				

All readings + NC [illegible] Hi C Ch

CONTINUED ON REVERSE SIDE

CALIBRATION DATA SHEET

DATE

MANUFACTURER	MODEL NO	SERIAL NO	PROCEDURE NO	TECHNICIAN

CALIBRATION EQUIPMENT

CALIBRATION DATA

PROC STEP NO (1)	FUNCTION TESTED (2)	READING OR VALUE NOMINAL (3)	READING OR VALUE MEASURED (4)	CORRECTED VALUE OF COLUMN (5)	✓ CHECK ONE: DEVIATION / CORRECTION / ERROR / ACTUAL VALUE (6)	CALIBRATION TOLERANCES LOWER LIMIT (7)	CALIBRATION TOLERANCES UPPER LIMIT (8)
	Aerometrics	Dev. (mv)	Dev. (mv)	100/K		(7) - (8)	
	TC (mv) STD	STD - no load	STD - 100K load			mv	
	4.210	0.005	0.011	0.5141192	✓	0.034	
	4.205	0.010	0.017	0.5128792	✓	0.036	
	4.225	0.049	0.057	0.5140 60	✓	0.035	
	4.210	0.012	0.018	0.513242	✓	0.037	
	4.208	-0.007	0.003	0.513116	✓	0.039	
	4.210	0.010	0.016	0.513242	✓	0.037	
	4.225	0.048	0.056	0.514060	✓	0.038	
	4.210	0.009	0.016	0.513294	✓	0.035	
	4.225	0.033	0.039	0.514060	✓	0.037	
	4.225	0.059	0.065	0.514060	✓	0.037	
	4.213	0.009	0.016	0.513400	✓	0.033	
	4.225	0.042	0.050	0.514060	✓	0.032	
	4.225	0.032	0.036	0.514060	✓	0.035	
	-78.446 °C av	0.0242	0.0308				

CONTINUED ON REVERSE SIDE

CALIBRATION DATA SHEET

ABC 3-028-008

DATE 25 MARCH 1966

MANUFACTURER	MODEL NO.	SERIAL NO.	PROCEDURE NO.	TECHNICIAN
ROMETRICS	TI-104A-200	As Noted	ATP 7906-007	R

CALIBRATION EQUIPMENT

MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE	MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE

CALIBRATION DATA

PROC. STEP NO. (1)	FUNCTION TESTED (2)	READING OR VALUE NOMINAL (3)	READING OR VALUE MEASURED (4)	CORRECTED VALUE OF COLUMN ____ (5)	✔ CHECK ONE: DEVIATION / CORRECTION / ERROR / ACTUAL VALUE (6)	CALIBRATION TOLERANCES LOWER LIMIT (7)	CALIBRATION TOLERANCES UPPER LIMIT (8)
	Response test - 1 Ne to GHe	1st	2nd	3rd	(ITC,	63%)	Sec.
	SN					Average	
	2	0.12	0.05	0.04		0.070	
	4	0.07	0.07	0.05		0.063	
	5	0.06	0.09	0.08		0.078	
	6	0.06	0.09	0.08		0.078	
	9	0.08	0.10	0.07		0.083	
	10	0.08	0.07	0.05		0.068	
	11	0.13	0.04	0.06		0.078	
	12	0.13	0.07	0.10		0.100	
	19	0.09	0.10	0.07		0.088	
	22	0.06	0.06	0.06		0.060	
	23	0.12	0.06	0.05		0.078	
	24	0.09	0.06	0.06		0.070	
	25	0.08	0.08	0.08		0.080	
	All readings are acceptable					H.O. Chandler 25 March 66	
					average	0.0765	

(CONTINUED ON REVERSE SIDE)

STEP 4 Response Test PAGE 9 of 11

CALIBRATION DATA SHEET

AEC 5-036-006

DATE 25 MARCH 1966

MANUFACTURER	MODEL NO	SERIAL NO	PROCEDURE NO	TECHNICIAN
CEROMETRICS	TI-104A-200	As Noted	ATP 7905-007	

CALIBRATION EQUIPMENT

MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE	MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE

CALIBRATION DATA

PROC. STEP NO. (1)	FUNCTION TESTED (2)	READING OR VALUE NOMINAL (3)	READING OR VALUE MEASURED (4)	CORRECTED VALUE OF COLUMN ____ (5)	✓ CHECK ONE: DEVIATION / CORRECTION / ERROR / ACTUAL VALUE (6)	CALIBRATION TOLERANCES LOWER LIMIT (7)	CALIBRATION TOLERANCES UPPER LIMIT (8)
	Response test - LN2 to LN2 (ITC, 63%) Sec						
	SN	1st	2nd	3rd		Minimum	
	2	0.18	0.17	0.14		0.163	
	4	0.20	0.20	0.25		0.218	
	5	0.18	0.16	0.15		0.163	
	6	0.15	0.18	0.22		0.218	
○	9	0.18	0.18	0.15		0.170	
	10	0.20	0.23	0.20		0.210	
	11	0.17	0.20	0.18		0.181	
	12	0.21	0.21	0.19		0.203	
	19	0.17	0.16	0.20		0.178	
	22	0.15	0.20	0.19		0.173	
	23	0.17	0.18	0.17		0.173	
	24	0.16	0.18	0.21		0.183	
	25	0.13	0.16	0.14		0.143	
	All readings are acceptable H.C Chandra 25 March 1966						
					av.	0.1695	
○							

(CONTINUED ON REVERSE SIDE)

STEP 5 POST CONTINUITY TEST PAGE 10 of 11

CALIBRATION DATA SHEET

AGC 3-026-005

DATE 25 MARCH 1966

MANUFACTURER	MODEL NO.	SERIAL NO.	PROCEDURE NO.	TECHNICIAN
CROMETRICS	TI-104A-200	As Noted	ATP 7905-007	R LTI 7A1308

CALIBRATION EQUIPMENT

MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE
LEA	4232-B	1573937	23 Aug 1966
LEA	9835-B	1546482	27 Oct 1966

MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE

CALIBRATION DATA

PROC. STEP NO. (1)	FUNCTION TESTED (2)	READING OR VALUE NOMINAL (3)	READING OR VALUE MEASURED (4)	CORRECTED VALUE OF COLUMN _____ (5)	✓ CHECK ONE: DEVIATION / CORRECTION / ERROR / ACTUAL VALUE (6)	CALIBRATION TOLERANCES LOWER LIMIT (7)	CALIBRATION TOLERANCES UPPER LIMIT (8)
	STEP 5	ESTABLISH POST CONTINUITY TEST					
		1	BLUE/BLACK				
			6 MIN.	6 MIN.	9 MIN.	2 SPECIFICATION	
			10 MAX.	10 MAX.	14 MAX.	UNITS	
		2	97.3 Ω	8.2 Ω	10.6 Ω		
		4	101.4	8.0	10.5		
		5	96.2	8.2	10.5		
		6	99.2	8.2	10.5		
		7	98.1	8.1	10.7		
		10	98.0	8.0	10.5		
		11	96.5	8.0	10.6		
		12	97.9	8.1	10.7		
		19	97.6	8.1	10.7		
		22	99.5	8.2	10.6		
		23	97.4	8.2	10.6		
		24	98.0	8.1	10.6		
		25	98.2	8.2	10.5		
	All readings are acceptable					W.C. Chamberlain 25 March 1966	

(CONTINUED ON REVERSE SIDE)

STEP 6 POST INSULATION TEST PAGE 11 OF 11

CALIBRATION DATA SHEET

ABC 8-028-008

DATE 25 MARCH 1966

MANUFACTURER	MODEL NO.	SERIAL NO.	PROCEDURE NO.	TECHNICIAN
ORO METRICS	TI-104A-200	As Noted	ATP 7905-007	R

CALIBRATION EQUIPMENT

MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE	MANUFACTURER	MODEL NO.	SERIAL NO.	RECALL DATE
WEC	799	1512	15 Sept 66				

CALIBRATION DATA

PROC. STEP NO. (1)	FUNCTION TESTED (2)	READING OR VALUE NOMINAL (3)	READING OR VALUE MEASURED (4)	CORRECTED VALUE OF COLUMN ____ (5)	✓ CHECK ONE: DEVIATION / CORRECTION / ERROR / ACTUAL VALUE (6)	CALIBRATION TOLERANCES LOWER LIMIT (7)	CALIBRATION TOLERANCES UPPER LIMIT (8)
	STEP 6		INSULATION TEST				
			RED/CASE				
		S/N	10 MEG MIN.				
		2	> 10,000	MEG OHMS			
		4	> 10,000				
		5	> 10,000				
		6	> 10,000				
		9	> 10,000				
		10	> 10,000				
		11	> 10,000				
		12	> 10,000				
		19	> 10,000				
		22	> 10,000				
		23	> 10,000				
		24	> 10,000				
		25	> 10,000				

All readings are acceptable

H.C. Chandler
25 March 1966

(CONTINUED ON REVERSE SIDE)

Enclosure 8
0700:1161

AEROMETRICS

CHROMEL-CONSTANTAN

THERMOCOUPLE EMF vs TEMPERATURE TABLE

AEROMETRICS

Chromel-Constantan
Thermocouple EMF vs Temperature Table

Temperature °C	mv. Out		Temperature °C	mv. Out	
	No Load	100K Load		No Load	100K Load
-273	9.787	9.763			
-272	9.786	9.762			
-271	9.785	9.761			
-270	9.785	9.761	-240	9.554	9.532
-269	9.784	9.760	-239	9.541	9.519
-268	9.781	9.757	-238	9.527	9.506
-267	9.778	9.754	-237	9.514	9.493
-266	9.775	9.751	-236	9.500	9.479
-265	9.771	9.747	-235	9.486	9.465
-264	9.767	9.743	-234	9.472	9.451
-263	9.763	9.739	-233	9.458	9.437
-262	9.758	9.735	-232	9.443	9.422
-261	9.752	9.729	-231	9.427	9.406
-260	9.747	9.724	-230	9.410	9.390
-259	9.741	9.718	-229	9.394	9.374
-258	9.735	9.712	-228	9.377	9.357
-257	9.728	9.705	-227	9.359	9.339
-256	9.721	9.698	-226	9.342	9.322
-255	9.713	9.690	-225	9.322	9.303
-254	9.705	9.682	-224	9.304	9.285
-253	9.696	9.673	-223	9.285	9.266
-252	9.688	9.665	-222	9.265	9.247
-251	9.677	9.655	-221	9.246	9.228
-250	9.668	9.646	-220	9.227	9.209
-249	9.658	9.636	-219	9.207	9.189
-248	9.646	9.624	-218	9.187	9.169
-247	9.637	9.615	-217	9.166	9.148
-246	9.626	9.603	-216	9.145	9.128
-245	9.614	9.592	-215	9.124	9.107
-244	9.602	9.580	-214	9.103	9.086
-243	9.590	9.568	-213	9.081	9.064
-242	9.578	9.556	-212	9.059	9.042
-241	9.566	9.544	-211	9.036	9.020

Temperature °C	mv. Out		Temperature °C	mv. Out	
	No Load	100K Load		No Load	100K Load
-210	8.013	8.007	-170	7.905	7.892
-209	8.990	8.974	-169	7.873	7.860
-208	8.967	8.950	-168	7.841	7.828
-207	8.944	8.927	-167	7.808	7.796
-206	8.920	8.903	-166	7.777	7.764
-205	8.896	8.880	-165	7.744	7.731
-204	8.872	8.856	-164	7.711	7.699
-203	8.848	8.832	-163	7.677	7.665
-202	8.823	8.807	-162	7.644	7.632
-201	8.799	8.783	-161	7.610	7.598
-200	8.773	8.758	-160	7.577	7.565
-199	8.747	8.732	-159	7.543	7.531
-198	8.721	8.706	-158	7.509	7.497
-197	8.695	8.680	-157	7.474	7.463
-196	8.669	8.654	-156	7.440	7.428
-195	8.642	8.627	-155	7.405	7.393
-194	8.615	8.600	-154	7.370	7.358
-193	8.588	8.573	-153	7.354	7.343
-192	8.560	8.545	-152	7.298	7.287
-191	8.532	8.469	-151	7.264	7.252
-190	8.505	8.491	-150	7.227	7.215
-189	8.477	8.463	-149	7.191	7.180
-188	8.449	8.435	-148	7.155	7.144
-187	8.420	8.406	-147	7.119	7.107
-186	8.390	8.377	-146	7.083	7.072
-185	8.362	8.348	-145	7.046	7.035
-184	8.332	8.318	-144	7.009	6.998
-183	8.302	8.288	-143	6.972	6.961
-182	8.272	8.259	-142	6.935	6.924
-181	8.242	8.229	-141	6.898	6.887
-180	8.213	8.199	-140	6.860	6.849
-179	8.183	8.169	-139	6.822	6.811
-178	8.152	8.139	-138	6.784	6.774
-177	8.121	8.108	-137	6.746	6.735
-176	8.091	8.078	-136	6.708	6.697
-175	8.061	8.048	-135	6.669	6.659
-174	8.030	8.017	-134	6.630	6.620
-173	7.998	7.985	-133	6.591	6.581
-172	7.967	7.954	-132	6.552	6.541
-171	7.936	7.924	-131	6.512	6.502

Temperature °C	mv. Out		Temperature °C	mv. Out	
	No Load	100K Load		No Load	100K Load
-130	6.472	6.462	- 90	4.741	4.734
-129	6.433	6.423	- 89	4.694	4.687
-128	6.393	6.383	- 88	4.648	4.644
-127	6.354	6.344	- 87	4.601	4.594
-126	6.313	6.303	- 86	4.553	4.545
-125	6.273	6.263	- 85	4.506	4.499
-124	6.232	6.223	- 84	4.458	4.452
-123	6.191	6.182	- 83	4.411	4.404
-122	6.150	6.140	- 82	4.363	4.356
-121	6.104	6.094	- 81	4.315	4.308
-120	6.067	6.058	- 80	4.267	4.261
-119	6.025	6.016	- 79	4.217	4.211
-118	5.983	5.974	- 78	4.171	4.164
-117	5.942	5.932	- 77	4.123	4.117
-116	5.900	5.891	- 76	4.075	4.168
-115	5.857	5.848	- 75	4.026	4.020
-114	5.814	5.805	- 74	3.977	3.971
-113	5.771	5.763	- 73	3.929	3.923
-112	5.729	5.720	- 72	3.879	3.873
-111	5.686	5.677	- 71	3.830	3.824
-110	5.642	5.633	- 70	3.781	3.775
-109	5.599	5.591	- 69	3.731	3.725
-108	5.556	5.547	- 68	3.681	3.676
-107	5.512	5.503	- 67	3.632	3.626
-106	5.468	5.459	- 66	3.582	3.577
-105	5.423	5.415	- 65	3.533	3.527
-104	5.379	5.371	- 64	3.482	3.476
-103	5.335	5.326	- 63	3.431	3.426
-102	5.290	5.282	- 62	3.381	3.375
-101	5.245	5.237	- 61	3.330	3.325
-100	5.200	5.192	- 60	3.279	3.274
- 99	5.155	5.147	- 59	3.229	3.224
- 98	5.110	5.102	- 58	3.178	3.173
- 97	5.064	5.056	- 57	3.126	3.121
- 96	5.018	5.010	- 56	3.076	3.071
- 95	4.972	4.965	- 55	3.024	3.019
- 94	4.926	4.919	- 54	2.972	2.968
- 93	4.881	4.873	- 53	2.921	2.916
- 92	4.835	4.827	- 52	2.869	2.865
- 91	4.788	4.781	- 51	2.787	2.783

Temperature °C	mv. Out		Temperature °C	mv. Out	
	No Load	100K Load		No Load	100K Load
-50	2.765	2.761	-10	0.578	0.577
-49	2.713	2.709	- 9	0.521	0.521
-48	2.660	2.656	- 8	0.462	0.462
-47	2.608	2.604	- 7	0.405	0.405
-46	2.555	2.551	- 6	0.347	0.347
-45	2.503	2.499	- 5	0.288	0.288
-44	2.450	2.446	- 4	0.230	0.230
-43	2.396	2.393	- 3	0.171	0.171
-42	2.344	2.340	- 2	0.113	0.113
-41	2.290	2.287	- 1	0.055	0.055
-40	2.237	2.234	0	0.004	0.004
-39	2.184	2.180	1	-0.053	-0.053
-38	2.130	2.127	2	-0.110	-0.110
-37	2.076	2.073	3	-0.168	-0.168
-36	2.023	2.020	4	-0.226	-0.226
-35	1.968	1.965	5	-0.282	-0.282
-34	1.915	1.912	6	-0.341	-0.341
-33	1.860	1.857	7	-0.399	-0.399
-32	1.805	1.803	8	-0.457	-0.457
-31	1.751	1.748	9	-0.516	-0.515
-30	1.696	1.693	10	-0.574	-0.574
-29	1.641	1.639	11	-0.632	-0.632
-28	1.587	1.584	12	-0.691	-0.691
-27	1.532	1.530	13	-0.749	-0.750
-26	1.476	1.472	14	-0.808	-0.808
-25	1.421	1.417	15	-0.867	-0.868
-24	1.366	1.364	16	-0.926	-0.927
-23	1.310	1.308	17	-0.985	-0.986
-22	1.255	1.253	18	-1.043	-1.044
-21	1.199	1.197	19	-1.102	-1.103
-21	1.143	1.141	20	-1.162	-1.163
-19	1.087	1.085	21	-1.221	-1.222
-18	1.031	1.030	22	-1.281	-1.282
-17	0.975	0.973	23	-1.340	-1.342
-16	0.918	0.917	24	-1.399	-1.401
-15	0.862	0.861	25	-1.459	-1.460
-14	0.806	0.805	26	-1.519	-1.520
-13	0.749	0.748	27	-1.579	-1.580
-12	0.692	0.691	28	-1.640	-1.641
-11	0.636	0.635	29	-1.700	-1.701

Temperature °C	mv. Out	
	No Load	100% Load
30	-1.760	-1.761
31	-1.820	-1.822
32	-1.880	-1.882
33	-1.941	-1.942
34	-2.002	-2.003
35	-2.061	-2.062
36	-2.122	-2.123
37	-2.183	-2.184
38	-2.245	-2.246
39	-2.306	-2.307
40	-2.367	-2.368
41	-2.366	-2.367
42	-2.490	-2.492
43	-2.551	-2.553
44	-2.612	-2.613
45	-2.674	-2.675
46	-2.736	-2.737
47	-2.798	-2.799
48	-2.859	-2.861
49	-2.921	-2.923
50	-2.983	-2.985
51	-3.046	-3.047
52	-3.108	-3.109
53	-3.171	-3.172
54	-3.232	-3.234
55	-3.295	-3.296
56	-3.358	-3.359
57	-3.421	-3.422
58	-3.483	-3.485
59	-3.546	-3.548
60	-3.609	-3.611

Enclosure 9
0700:1161

CALIBRATION DATA SHEETS

FOR 13 PRODUCTION TRANSDUCERS

CALIBRATION DATA SHEET
SN 2

H C Chapman
13 April 1966

	Temp.		Inverse Temp. 100/K or 100/°R	No Load: Element R_o = 97.6217			TC	Transducer Output	Correction	Corrected Transducer Output	100K Load: Element		TC	Transducer Output	Correction	Corrected Transducer Output
	K	C		R_T/R_o	R_T	mv	mv	mv	mv	mv	Ω	mv	mv	mv	mv	mv
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
	19.396	-253.804	5.149027	2.308992	225.408	51.844	9.703		-0.170	61,377	224.902	51.727	9.680		-0.191	61,216
	20.150	-253.	4.962780	2.251695	219.815	50.557	9.696			60.083	219.332	50,446	9.673			59.928
	23.156	-249.994	4.318535	2.077214	202.341	46.539	9.668			56,037	201.933	46.445	9.646			55,900
LN₂	27.070	-246.080	3.694127	1.890493	185.529	42.672	9.627			52,129	185.185	42.593	9.604			52,006
LN₂	27.134	-246.016	3.685413	1.898215	185.307	42.601	9.626	52.227	-0.170	52.057	184.965	42,542	9.603	52.145	-0.191	51.954
	31.360	-241.790	3.188776	1.748379	172.632	39.604	9.575		-0.168	49.011	172.334	39,637	9.553		-0.188	49,002
	38.882	-234.268	2.571884	1.606422	156.821	36.069	9.476		-0.166	45,379	156.575	36,012	9.455		-0.183	45,284
	48.665	-225.085	2.055515	1.473856	143.881	33.092	9.324		-0.164	42,252	143,674	33,045	9.305		-0.178	42,172
	63,701	-209.449	1.569834	1.333086	130.139	29.937	9,000		-0.160	38,777	129.970	29,893	8.984		-0.168	38,709
LN₂	77.474	-195.676	1.290751	1.253323	122.351	28.141	8.660		-0.156	36,645	122,202	28,106	8.645		-0.160	36,591
LN₂	77.426	-195.724	1.291556	1.253553	122.374	28.146	8.662	36.808	-0.156	36,652	122,225	28,112	8.647	36.759	-0.160	36,599
	83.150	-190	1.202645	1.227259	119.807	27.556	8,505		-0.154	35.907	119.663	27,522	8.491		-0.156	35.855
	88.200	-184.950	1.133786	1.207074	117.836	27,102	8.361		-0.152	35,311	117,697	27,070	8,347		-0.157	35,260
	93.410	-179.740	1.070549	1.183990	115.583	26.584	8,205		-0.150	34,675	115,449	26.553	8,191		-0.155	34,589
CO_2	195.454	-77.696	0.511629	1.026814	100.239	23.055	4.156		-0.114	27,099	100,139	23,032	4,150		-0.118	27,064
CO_2	194.482	-78.308	0.514192	1.027025	100.259	23.060	4,185	27.245	-0.114	27,131	100.159	23,037	4.178	27.215	-0.118	27,097
ICE	—	⊖	—	1.000000	97.622	22.453	⊖		⊖	22,453	97.526	22,431	⊖		+0.007	22,438
ICE	—	⊖	—	1.00000	97.622	22.453	⊖	22.453	⊖	22,453	97.526	22,431	⊖	22,431	+0.007	22,438
	333.193	60,043	0.300126	1.002906	97.906	22.518	-3,612		-0.207	18,699	97,810	22,496	-3,614		-0.210	18,672
	—	56.806	—	1.002749	97.890	22.515	-3,409	19.106	-0.107	18.899	97.794	22,493	-3,410	19,163	-0.210	18,873
	—	60	—	1.002904	97,905	22,519	-3.609		↓	18,703	97,809	22,496	-3,611		↓	18.675

Transducer Calibration Data
Calculated Full Range

Transducer Calibration Data

Transducer Calibration Data
Calculated Mid Range

Transducer Calibration Data

Transducer Calibration Data

Transducer Calibration Data
Calculated 0 Range

22.452991

$$(6) = \widetilde{I_c R_o} \left(R_T/R_o\right)$$

CALIBRATION DATA SHEET
SN 4
H.C. Chandler
7 April 1966

	Temp.		Inverse Temp. 100/K	No LOAD Element R_o = 100.487			TC	Transducer Output	Correction	Corrected Transducer Output	100K LOAD Element		TC	Transducer Output	Correction	Corrected Transducer Output	
	K	C	100/K	R_T/R_o	R_T	mv	mv	mv	mv	mv	Reg.	mv	mv	mv	mv	mv	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	
	19.295	-253.855	5.182680	2.319548	233.084	53.609	9.704		0.143	63.456	232.542	53.485	9.681		0.121	63.287	
	21.150	-253	4.962780	2.256825	226.782	52.160	9.696		↓	62.269	226.268	52.042	9.673		↓	61.836	Calculated Full Range
	20.871	-252.279	4.791338	2.207930	221.868	51.030	9.690			60.863	221.376	50.916	9.667			60.704	
	23.290	-249.860	4.293431	2.071563	208.165	47.878	9.667			57.688	207.733	47.779	9.645			57.545	
	26.471	-246.679	3.777641	1.928357	193.775	44.568	9.633			54.344	193.400	44.482	9.610			54.213	
LNe	27.134	-246.016	3.685413	1.903777	191.304	44.000	9.626	53.626	+0.143	53.769	190.909	43.916	9.603	53.519	+0.121	53.640	Transducer Calibration Data
	30.956	-242.194	3.230440	1.782546	179.123	41.198	9.580		0.129	50.907	178.803	41.125	9.558		0.108	50.791	
	37.784	-235.366	2.649111	1.627850	163.517	37.609	9.491		0.106	47.206	163.249	37.547	9.470		0.087	47.094	
	42.124	-231.673	2.373930	1.553896	156.146	35.914	9.438		0.096	45.448	155.903	35.858	9.417		0.077	45.352	
LN_2	77.519	-195.631	1.290001	1.253033	125.914	28.960	8.659		-0.026	37.593	125.756	28.924	8.644		-0.032	37.536	
LH_2	77.412	-195.732	1.291839	1.253468	125.959	28.971	8.662	37.633	-0.026	37.607	125.500	28.934	8.647	37.581	-0.032	37.549	Transducer Calibration Data
	83.150	-190	1.202445	1.228829	123.481	28.401	8.505		-0.024	36.882	123.329	28.366	8.491		-0.031	36.826	Calculated M.F. Range
CO_2	194.689	-78.461	0.513639	1.026404	103.140	23.722	4.192		0.016	27.930	103.034	23.698	4.185		0.012	27.895	
CO_2	194.936	-78.214	0.512978	1.026336	103.133	23.721	4.181	27.902	+0.016	27.918	103.027	23.696	4.174	27.870	+0.012	27.882	Transducer Calibration Data
ICE	—	⊖	—	1.000000	100.487	23.112	⊖		⊖	23.112	100.387	23.089	⊖		0.003	23.092	
ICE	—	⊖	—	1.000000	100.487	23.112	⊖	23.112	⊖	23.112	100.387	23.089	⊖	23.089	+0.003	23.092	Transducer Calibration Data
AMB	295.440	22.290	0.338479	0.995512	100.438	23.101	-1.298		0.070	21.873	100.338	23.078	-1.297		0.070	21.851	
	—	57.142	—	1.001997	100.688	23.158	-3.430	19.728	+0.181	19.909	100.586	23.135	-3.431	19.704	+0.175	19.879	Transducer Calibration Data
	331.340	58.240	0.301759	1.002075	100.696	23.160	-3.498		↓	19.843	100.594	23.137	-3.500		↓	19.812	
	—	60	—	1.002200	100.708	23.163	-3.609			19.735	100.606	23.139	-3.611			19.703	Calculated 0 Range
					23.112												

(6) = $I_c R_T$ = $I_c R_o (R_T/R_o)$

CALIBRATION DATA SHEET
SN 5
H.C. Chanlon
13 April 1966

	Temp.		Inverse Temp. 100/K or 100/K+273.15	No LOAD: Element R_o = 97.1478			TC	Transducer Output	Correction	Corrected Transducer Output	100K LOAD: Element		TC	Transducer Output	Correction	Corrected Transducer Output	
	K	C		R_T/R_o	R_T	mv	mv	mv	mv	mv	Reg.	mv	mv	mv	mv	mv	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	
	19.346	-253.804	5.169027	2.309866	224.399	51,612	9.703		-0.717	60.598	223.897	51.496	9.680		-0.716	60.460	
	21.152	-253	4.962780	2.251756	218.754	50 313	9.696		↓	59.292	218.276	50,203	9.673		↓	59.160	Calculated Field Range
	23.156	-249.994	4.318535	2.070236	201,120	46,257	9.668			55.208	200.717	46,165	9.646			55.095	
LN_2	22.072	-246.080	3.644127	1.898860	184.470	42,428	9.627			51.338	184,131	42,350	9.604			51,238	
LN_2	27,139	-246,011	3,684734	1.896418	184,233	42.374	9.626	52,000	-0.717	51.283	183.895	42,296	9.603	51.899	-0.716	51.183	Transducer Calibration Data
	31.360	-241,790	3.188776	1.767476	171,707	39,492	9.575		-0.695	48,372	171,412	39,425	9.553		-0,695	48,283	
	38.882	-234.268	2.571884	1,605520	155.793	35,874	9.476		-0.656	44,694	155.550	35.776	9.455		-0.656	44,575	
	48.065	-225,085	2.080515	1,473310	143,129	32,920	9.324		-0.605	41, 639	142,925	32,873	9.305		-0.607	41,571	
	63.701	-209.449	1.569834	1.332714	129.470	29.778	9,000		-0.522	38,256	129.303	29,740	8.984		-0.527	38,197	
LN_2	77.474	-195,676	1.290251	1.253099	121,736	27,999	8,660		-0,449	36,210	121.588	27,965	8,645		-0,455	36,155	
LN_2	77.418	-195.732	1.291189	1.253329	121,756	28,004	8,662	36.666	-0,449	36.217	121.610	27.970	8,647	36.617	-0,455	36.162	Transducer Calibration Data
	83,151	-190	1,202645	1,227045	119,205	27,417	8,515		-0.447	35.475	119,063	27,384	8,491		-0.453	35.422	Calculated Mid Range
	88,200	-184,950	1,133786	1,206867	117,245	26,966	8,361		-0,445	34,882	117,108	26,935	8.347		-0.451	34,831	
	93,410	-179,740	1,070549	1,18354	114,980	26,445	8,205		-0.443	34,207	114,848	26,415	8,191		-0.450	34,156	
CO_2	195,454	-77,696	0.511629	1,026938	99.765	22,946	4,156		-0.409	26,693	99,665	22,923	4,150		-0,414	26,659	
CO_2	194.534	-78,616	0.514060	1.027257	99,776	22,953	4,159	27,152	-1,409	26,743	99,696	22,930	4,192	27,122	-0, 414	26,708	Transducer Calibration Data
RE	—	⊖	—	1,000000	97,148	22,344	⊖		⊖	22,344	97,054	22,322	⊖		+0,002	22,324	
ICE	—	⊖	—	1,000000	97,146	22,344	⊖	22,344	⊖	22,344	97.654	22,322	⊖	22,322	+0,002	22,324	Transducer Calibration Data
	333,193	60,043	0,300126	1,002727	97,413	22,405	-3,612		-0.383	18,410	97,319	22,383	-3,614		-0,383	18,386	
	—	60,392	—	1,002743	97,414	22,405	-3 634	18,771	-0,383	18,385	97,320	22,384	-3,636	18,743	-0,383	18,365	Transducer Calibration Data
	—	60	—	1,002725	97, 413	22,405	-3.609		↓	18,413	97,319	22,383	-3,611		↓	18,389	Calculated O Range

$$(6) = \overbrace{I_c R_o}^{22,343994} \left(R_T/R_o\right)$$

CALIBRATION DATA SHEET
SN 6

H. C. Chandler

5 April 1966

	Temp. °K	Temp. °C	Inverse Temp. 100/°K or 100/°C+273.15	NO LOAD Element R_o = 98.3478 R_T/R_o	R_T (1)	mv (I_c = 0.23ma)	TC (2) mv	Transducer Output (1)+(2) mv	Correction mv	Corrected Transducer Output mv	100 K LOAD Element I_c = 0.23ma Reg (3)	mv	TC (4) mv	Transducer (3)+(4) mv	Correction mv	Corrected Transducer Output mv	CALIBRATION DATA SHEET SN 6
	16.302	-256.848	6.13436	2.59664	255.374	58.736	9.727		+0.022	63.485	254.724	58.587	9.704		+0.008	68.299	
	18.727	-254.427	5.33942	2.34969	231.068	53.150	9.708			62.880	230.535	53.023	9.685			62.716	
	20.150	-253	4.96278	2.244496	220.742	50.770	9.696			60.488	220.255	50.659	9.673			60.340	Calculated Full Range
	22.429	-250.721	4.45855	2.103675	206.891	47.585	9.674			57.281	206.464	47.487	9.652			57.147	
	25.988	-247.162	3.84801	1.938765	190.673	43.855	9.638			53.515	190.310	43.771	9.615			53.394	
LN_2	27.131	-246.019	3.685820	1.899767	186.838	42.973	9.626			52.621	186.489	42.892	9.603			52.503	
LN_2	27.135	-246.015	3.685277	1.899618	186.823	42.969	9.626	52.595	+0.022	52.617	186.474	42.889	9.603	52.492	+0.008	52.500	Transducer Calibration Data
	29.436	-243.714	3.39725	1.820610	179.053	41.182	9.598		0.016	50.796	178.733	41.109	9.577		0.002	50.688	
	37.528	-235.622	2.66459	1.626370	159.950	36.788	9.495		-0.004	46.279	159.694	36.730	9.474		-0.017	46.187	
	40.588	-232.562	2.46375	1.570029	154.409	35.514	9.451		-0.011	44.954	154.172	35.460	9.430		-0.024	44.866	
	45.206	-227.944	2.21209	1.502987	147.816	33.998	9.376		-0.023	43.351	147.598	33.948	9.355		-0.037	43.266	
	52.195	-220.955	1.91590	1.423705	140.018	32.204	9.245		-0.039	41.410	139.822	32.159	9.227		-0.051	41.355	
	63.155	-209.995	1.58340	1.332019	131.001	30.130	9.013		-0.066	39.077	130.830	30.091	8.997		-0.078	39.010	
LN_2	77.498	-195.652	1.29036	1.251493	123.081	28.309	8.659		-0.100	36.868	122.930	28.274	8.645		-0.111	36.808	
LN_2	77.491	-195.679	1.290806	1.251656	123.098	28.312	8.660	36.972	-0.100	36.872	122.947	28.278	8.645	36.923	-0.111	36.812	Transducer Calibration Data
	78.787	-194.363	1.269244	1.243859	122.331	28.136	8.625			36.661	122.182	28.102	8.610		-0.111	36.601	
	83.150	-190	1.202245	1.224469	120.424	27.697	8.505			36.102	120.280	27.664	8.491		-0.110	36.045	Calculated Mid Range
	97.573	-175.577	1.024873	1.172709	115.333	26.527	8.078			34.505	115.200	26.496	8.065		-0.109	34.452	
	122.404	-150.746	0.8167967	1.113632	109.523	25.190	7.255			32.345	109.403	25.163	7.237		-0.106	32.294	
CO_2	194.642	-78.508	0.5137763	1.030036	101.302	23.299	4.194			27.393	101.200	23.276	4.188		-0.096	27.368	
CO_2	194.837	-78.313	0.5132342	1.029962	101.294	23.298	4.185	27.483	-0.100	27.393	101.192	23.274	4.178	27.452	-0.096	27.356	Transducer Calibration Data
ICE	—	⊖	—	1.000000	98.3478	22.620	⊖		⊖	22.620	98.252	22.598	⊖		+0.008	22.606	
ICE	—	⊖	—	1.000000	98.3478	22.620	⊖	22.620	⊖	22.620	98.252	22.598	⊖	22.598	+0.008	22.606	Transducer Calibration Data
AMB	294.463	21.313	—	1.000664	98.413	22.635	-1.240		0.012	21.407	98.317	22.613	-1.241		0.022	21.394	
		56.762	—	1.001413	98.406	22.652	-3.343	19.309	+0.031	19.340	98.310	22.611	-3.344	19.267	+0.047	19.314	Transducer Calibration Data
		58.599	—	1.001452	98.490	22.653	-3.521			19.163	98.394	22.631	-3.523			19.155	
		60	—	1.001480	98.493	22.653	-3.609			19.075	98.397	22.631	-3.611			19.067	Calculated 0 Range

$$E_{element} = I_c R_o \left(R_T/R_o\right) = 22.619994 \left(R_T/R_o\right)$$

CALIBRATION DATA SHEET
SN 9

H.C. Chapelon
6 April 1964

	T. Temp. °K	T. Temp. °C	Inverse Temp. 100/K or 1000/(T+273.15)	NO LOAD: Element R_o = 97.3043 Ω (1) R_T/R_o	(1) R_T	(1) mV (I_c = 0.23 ma)	TC (2) mV	Transducer Output (A) + 12.1 mV	Correction mV	Corrected Transducer Output mV	100K LOAD: Element I_c = 0.23 ma (3) Reg.	(3) mV	TC (4) mV	Transducer (B) + (N) mV	Correction mV	Corrected Transducer Output mV	CALIBRATION DATA SHEET SN 9
	16.302	-256.848	6.13436	2.577307	250.078	57.680	9.727		+0.307	67.714	249.454	57.374	9.704		+0.297	67.375	
	18.727	-254.422	5.33942	2.342954	227.979	52.435	9.708			62.450	227.460	52.316	9.685			62.298	
	20.150	-253	4.96228	2.237400	217.708	50.073	9.696			60.076	217.234	49.964	9.673			59.934	Calculated Full Range
	22.429	-250.721	4.45855	2.096067	203.956	46.910	9.674			56.891	203.541	46.814	9.652			56.763	
	25.988	-247.162	3.84801	1.932753	188.065	43.255	9.638			53.200	187.712	43.174	9.615			53.086	
LN_2	27.131	-246.019	3.685820	1.888884	183.796	42.273	9.626			52.206	183.458	42.195	9.603			52.095	
LN_2	27.131	-246.019	3.685820	1.888884	183.796	42.273	9.626	51.899	+0.307	52.206	183.458	42.195	9.603	51.798	+0.297	52.095	Transducer Calibration Data
	29.436	-243.714	3.39725	1.815659	176.671	40.634	9.598		0.301	50.533	176.359	40.563	9.577		0.291	50.431	
	31.528	-235.622	2.66459	1.622949	157.919	36.322	9.495		0.282	46.099	157.670	36.264	9.474		0.273	46.011	
	40.588	-232.562	2.46375	1.566133	152.391	35.050	9.451		0.275	44.776	152.159	34.997	9.430		0.264	44.691	
	45.206	-227.944	2.21209	1.499711	145.928	33.564	9.376		0.264	43.204	145.715	33.514	9.355		0.253	43.122	
	52.145	-220.955	1.91590	1.420797	138.249	31.797	9.245		0.247	41.289	138.058	31.753	9.227		0.236	41.216	
	63.155	-209.995	1.58340	1.329554	129.371	29.755	9.013		0.221	38.989	129.204	29.717	8.997		0.210	38.924	
LN_2	72.498	-195.652	1.29036	1.247794	121.415	27.926	8.659		0.187	36.772	121.268	27.892	8.645		0.176	36.713	
LN_2	77.421	-195.729	1.291637	1.248151	121.450	27.934	8.662	36.596	+0.187	36.783	121.303	27.900	8.647	36.547	+0.176	36.723	Transducer Calibration Data
	78.787	-194.363	1.269244	1.240785	120.733	27.769	8.625		0.185	36.579	120.587	27.735	8.610		0.175	36.520	
	83.150	-190	1.202645	1.221525	118.859	27.338	8.505		0.181	36.024	118.718	27.305	8.491		0.170	35.966	Calculated Mid Range
	97.573	-175.577	1.024873	1.170116	113.857	26.187	8.078		0.166	34.431	113.727	26.157	8.065		0.155	34.377	
	122.404	-150.746	0.816967	1.111858	108.188	24.883	7.255		0.140	32.278	108.071	24.856	7.237		0.129	32.222	
CO_2	194.642	-78.508	0.513763	1.029109	100.136	23.031	4.194		0.065	27.290	100.036	23.008	4.188		0.56	27.252	
CO_2		-78.263		1.029018	100.128	23.029	4.183	27.212	+0.064	27.276	100.028	23.006	4.176	27.182	+0.055	27.237	Transducer Calibration Data
ICE	—	〃	—	1.00000	97.304	22.380	〃		〃	22.380	97.210	22.358	〃		-0.006	22.352	
ICE	—	〃	—	1.00000	97.304	22.380	〃	22.380	〃	22.380	97.210	22.358	〃	22.358	-0.006	22.352	Transducer Calibration Data
AMB	294.463	21.313	—	1.000639	97.366	22.394	-1.240		0.009	21.163	97.271	22.372	-1.241		0.004	21.135	
		56.272	—	1.001403	97.441	22.411	-3.407	19.004	+0.026	19.030	97.346	22.390	-3.408	18.982	+0.021	19.003	Transducer Calibration Data
		58.579	—	1.001443	97.444	22.413	-3.521			18.918	97.349	22.390	-3.523			18.888	
		60	—	1.001473	97.447	22.413	-3.609			18.830	97.352	22.391	-3.611			18.801	Calculated O Range

$E_{elem} = I_c R_o (R_T/R_o) = 22.38001 (R_T/R_o)$

CALIBRATION DATA SHEET

SN 10

N.C. Chandler

6 April 1966

	Temp. K	Temp. C	Inverse Temp. 100/K	No Load: Element R_o = 96.9304 R_T/R_o	No Load: Element R_T	No Load: Element mv	No Load: TC mv	No Load: Transducer Output mv	No Load: Correction mv	No Load: Corrected Transducer Output mv	100K Load: Element Reg.	100K Load: Element mv	100K Load: TC mv	100K Load: Transducer mv	100K Load: Correction mv	100K Load: Corrected Transducer Output mv	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	
	16.302	-256.848	6.13436	2.594386	251.474	57.840	9.727		0.195	67.762	250.934	57.715	9.704		0.236	67.655	
	18.727	-254.422	5.33942	2.360987	228.850	52.636	9.708			62.539	228.327	52.515	9.685			62.436	
	20.150	-253	4.96275	2.272245	220.249	50.656	9.696			60.547	219.766	50.546	9.673			60.455	Calculated Full Range
	22.429	-250.721	4.45855	2.110490	204.570	47.051	9.674			56.920	204.151	46.955	9.652			56.843	
	25.988	-247.162	3.84801	1.945140	188.547	43.366	9.638			53.199	188.191	43.284	9.615			53.135	
LN_2	27.131	-246.019	3.685820	1.897365	183.912	42.301	9.626			52.122	183.574	42.222	9.603			52.061	
LN_2	27.134	-246.016	3.685413	1.897266	183.902	42.298	9.626	51.924	+0.195	52.119	183.564	42.220	9.603	51.923	+0.236	52.059	Transducer Calibration Data
	29.436	-243.714	3.397250	1.827496	177.139	40.742	9.598		0.190	50.530	176.826	40.670	9.577		0.228	50.475	
	37.528	-235.622	2.66459	1.631355	158.127	36.370	9.495		0.173	46.038	157.878	36.312	9.474		0.204	45.990	
	40.558	-232.562	2.46375	1.572570	152.429	35.059	9.451		0.167	44.677	152.198	35.006	9.430		0.195	44.631	
	45.206	-227.944	2.21209	1.505217	145.901	33.557	9.376		0.158	43.091	145.688	33.508	9.355		0.181	43.044	
	52.195	-220.955	1.91590	1.425402	138.164	31.778	9.245		0.143	41.166	137.974	31.734	9.227		0.160	41.121	
	63.155	-209.995	1.58340	1.333333	129.240	29.725	9.013		0.121	38.888	129.073	29.687	8.997		0.127	38.811	
LN_2	77.498	-195.652	1.29036	1.251392	121.297	27.898	8.659		0.093	36.650	121.150	27.864	8.645		0.085	36.594	
LN_2	77.427	-195.723	1.291539	1.251633	121.340	27.908	8.662	36.570	+0.093	36.663	121.193	27.874	8.647	36.521	+0.085	36.606	Transducer Calibration Data
	78.787	-194.363	1.269244	1.243500	120.532	27.723	8.625		0.091	36.439	120.386	27.689	8.610		0.084	36.383	
	83.150	-190	1.202645	1.224140	118.656	27.291	8.575		0.089	35.885	118.515	27.259	8.491		0.083	35.832	Calculated Mid Range
	97.573	-175.577	1.024823	1.172462	113.647	26.139	8.078		0.083	34.300	113.518	26.109	8.065		0.076	34.250	
	122.404	-150.746	0.816967	1.112596	107.844	24.804	7.255		0.071	32.130	107.728	24.777	7.237		0.065	32.079	
CO_2	194.642	-78.508	0.513263	1.029336	99.774	22.948	4.194		0.039	27.181	99.674	22.925	4.188		0.032	27.145	
CO_2	194.642	-78.508	0.513242	1.029261	99.766	22.946	4.185	27.131	+0.039	27.170	99.666	22.923	4.178	27.101	+0.032	27.133	Transducer Calibration Data
ICE	—	〃	—	1.000000	96.930	22.294	〃		〃	22.294	96.836	22.272	〃		-0.006	22.266	
ICE	—	〃	—	1.000000	96.930	22.294	〃	22.294	〃	22.294	96.836	22.272	〃	22.272	-0.006	22.266	Transducer Calibration Data
AMB	294.463	21.313	—	1.000120	96.942	22.297	-1.240		0.060	21.117	96.011	22.083	-1.241		0.045	20.887	
		56.752	—	1.000904	97.018	22.314	-3.467	18.847	+0.164	19.011	96.924	22.293	-3.468	18.825	+0.130	18.955	Transducer Calibration Data
	331.749	58.599	—	1.000948	97.022	22.315	-3.521			18.958	96.928	22.293	-3.523			18.900	
		60	—	1.000971	97.025	22.316	-3.609			18.871	96.931	22.294	-3.611			18.813	Calculated O Range

(6) = $I_c R_T = I_c R_o (R_T/R_o)$ (22.294)

(10) = (6) + (7) + (9)

(11) = $\frac{(5)(100K)}{(5) + (100K)}$

(12) = (14) (0.23m)

(16) = (12)+(13)+(15)

CALIBRATION DATA SHEET SN 11

H. C. Chamberlain 13 April 1966

	Temp.		Inverse Temp. 100/K or 100/K×0.3315	No Load							100K Load						
				Element R_o = 95.3696			TC	Translucer Output	Correction	Corrected Translucer Output	Element		TC	Translucer Output	Correction	Corrected Translucer Output	
	K	C		R_T/R_o	R_T	mv	mv	mv	mv	mv	Req.	mv	mv	mv	mv	mv	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	
	19.346	-253.804	5.169027	2.318049	221.072	50.846	9.703		0.013	60.562	220.585	50.735	9.680		+0.001	60.416	
	20.150	-253	4.962780	2.266018	215.539	49.573	9.696		↓	59.282	215.073	49.467	9.673		↓	59.141	Calculated Full Range
	23.156	-249.994	4.318535	2.078746	198.250	45.597	9.668			55.278	197.858	45.047	9.646			54.721	
LHe	27.070	-246.080	3.694127	1.900513	181.252	41.688	9.627			51.328	180.925	41.613	9.604			51.218	
LN₂	27.139	-246.011	3.684734	1.898136	181.025	41.636	9.626	51.262	+0.013	51.275	180.698	41.561	9.603	51.164	+0.001	51.165	Translucer Calibration Data
	31.360	-241.790	3.188776	1.772611	169.054	38.882	9.575		0.010	48.467	168.769	38.817	9.553		-0.001	48.369	
	35.862	-234.268	2.871884	1.608494	153.402	35.282	9.476		0.005	44.763	153.168	35.229	9.455		-0.004	44.680	
	48.065	-225.085	2.080515	1.475735	140.741	32.370	9.324		-0.001	41.693	140.543	32.325	9.305		-0.009	41.621	
	63.701	-209.449	1.569834	1.333429	127.169	29.249	9.000		-0.012	38.237	127.008	29.212	8.984		-0.017	38.179	
LN₂	77.474	-195.676	1.290251	1.252030	119.410	27.464	8.660		-0.021	36.103	119.268	27.432	8.645		-0.024	36.053	
LN₂	77.417	-195.733	1.291706	1.252305	119.432	27.469	8.662	36.131	-0.021	36.110	119.290	27.437	8.647	36.084	-0.024	36.060	Translucer Calibration Data
	83.150	-190	1.202645	1.226582	116.979	26.905	8.505		-0.023	35.387	116.842	26.874	8.491		-0.024	35.341	Calculated Med Range
	88.200	-184.950	1.133786	1.206843	115.097	26.472	8.361		-0.024	34.809	114.965	26.442	8.347		-0.028	34.761	
	93.410	-179.740	1.070549	1.183757	112.895	25.966	8.205		-0.25	34.146	112.768	25.937	8.191		-0.30	34.098	
CO_2	195.454	-77.696	0.511629	1.026759	97.922	22.522	4.156		-0.052	26.626	97.826	22.500	4.150		-0.062	26.588	
CO_2	194.534	-78.616	0.514060	1.027076	97.952	22.528	4.199	26.727	-0.052	26.675	97.856	22.507	4.192	22.699	-0.062	26.637	Translucer Calibration Data
ICE	—	〃	—	1.000000	95.370	21.935	〃		〃	21.935	95.279	21.914	〃		-0.005	21.909	
ICE	—	〃	—	1.000000	95.370	21.935	〃	21.935	〃	21.935	95.279	21.914	〃	21.914	-0.005	21.909	Translucer Calibration Data
	333.193	60.043	0.300126	1.002562	95.614	21.991	-3.612		0.213	18.592	95.522	21.970	-3.614		+0.211	18.567	
	—	57.233	—	1.002442	95.603	21.989	-3.435	18.554	+0.213	18.767	95.511	21.968	-3.436	18.532	+0.211	18.743	Translucer Calibration Data
	—	60	—	1.002560	95.614	21.991	-3.609		↓	18.595	95.522	21.970	-3.611		↓	18.570	Calculated 0 Range

$$(6) = \widetilde{21.935008}\ I_c R_o (R_T/R_o)$$

CALIBRATION DATA SHEET
SN 12

H.C. Chanlon

14 April 1966

Temp. K (1)	Temp. C (2)	Inverse Temp. 100/K or 100/(K+273.15) (3)	No LOAD: Element R_o = 97.3043, R_T/R_o (4)	No LOAD: Element R_T (5)	No LOAD: Element mv (6)	No LOAD: TC mv (7)	No LOAD: Transducer Output mv (8)	No LOAD: Correction mv (9)	No LOAD: Corrected Transducer Output mv (10)	100K LOAD: Element R_{eq} (11)	100K LOAD: Element mv (12)	100K LOAD: TC mv (13)	100K LOAD: Transducer Output mv (14)	100K LOAD: Correction mv (15)	100K LOAD: Corrected Transducer Output mv (16)	
19.343	-253.804	5.169027	2.293052	223.124	51.319	9.703		0.205	61.227	222.628	51.204	9.680		0.193	61.077	
20.15	-253	4.962780	2.236342	217.605	50.049	9.696			59.950	217.132	49.940	9.673			59.906	Calculated Full Range
23.156	-249.994	4.318535	2.059198	200.369	46.085	9.668			55.958	199.969	45.993	9.646			55.832	
LN_2 27.070	-246.080	3.694127	1.887194	183.632	42.235	9.627			52.067	183.295	42.158	9.604			51.955	
LN_2 27.139	-246.011	3.684734	1.884801	183.399	42.182	9.626	51.802	+0.205	52.013	183.064	42.105	9.603	51.708	+0.193	51.901	Transducer Calibration Data
31.360	-241.790	3.188776	1.758435	171.104	39.354	9.575		0.196	49.125	170.812	39.287	9.553		0.185	49.025	
38.882	-234.268	2.571884	1.597201	155.414	35.745	9.476		0.181	45.402	155.173	35.690	9.455		0.172	45.317	
48.065	-225.085	2.080515	1.467300	142.775	32.838	9.324		0.163	42.325	142.571	32.791	9.305		0.156	42.252	
63.701	-209.449	1.569834	1.327118	129.134	29.701	9.000		0.131	38.832	128.968	29.663	8.984		0.128	38.775	
LN_2 77.474	-195.676	1.290751	1.248174	121.452	27.934	8.660		0.105	36.699	121.305	27.900	8.645		0.106	36.651	
LN_2 77.418	-195.732	1.291689	1.248412	121.475	27.939	8.662	36.601	+0.105	36.706	121.328	27.905	8.647	36.552	+0.106	36.658	Transducer Calibration Data
83.150	-190	1.202645	1.222331	118.938	27.356	8.505		0.102	35.963	118.797	27.323	8.491		0.104	35.918	Calculated Mid Range
88.200	-184.950	1.133786	1.202317	116.991	26.908	8.361		0.099	35.368	116.854	26.876	8.347		0.102	35.325	
93.440	-179.740	1.070549	1.179511	114.771	26.397	8.205		0.098	34.700	114.639	26.367	8.191		0.100	34.658	
CO_2 195.454	-77.696	0.511629	1.026519	99.885	22.973	4.156		0.057	27.186	99.785	22.951	4.150		0.052	27.153	
CO_2 194.825	-78.325	0.513294	1.026734	99.905	22.978	4.186	27.164	+0.057	27.221	99.805	22.955	4.179	27.134	+0.052	27.186	Transducer Calibration Data
ICE —	—	—	1.000000	97.304	22.380	⊖		⊖	22.380	97.210	22.358	⊖		-0.008	22.350	
ICE —	—	—	1.000000	97.304	22.380	⊖	22.380	⊖	22.380	97.210	22.358	⊖	22.358	-0.008	22.350	Transducer Calibration Data
333.193	60.043	0.300126	1.002978	97.594	22.446	-3.612		0.044	18.878	96.647	22.229	-3.614		+0.043	18.658	
—	55.876	—	1.002771	97.574	22.442	-3.613	19.629	+0.044	19.073	97.478	22.420	-3.413	19.607	+0.043	19.650	Transducer Calibration Data
—	60	—	1.002976	97.594	22.447	-3.609		↓	18.882	96.647	22.229	-3.611		↓	18.661	Calculated 0 Range

22.37 9989

$(6) = I_c R_o (R_o/R_T)$

CALIBRATION DATA SHEET

SN 19

N. C. Chambers

14 April 1966

	Temp.		Inverse Temp. 100/K or 100/C+273.15	No LOAD Element R_o = 96.8696			TC	Transducer Output	Corrected	Corrected Transducer Output	100 K LOAD Element		TC	Transducer Output	Corrected	Corrected Transducer Output
	K	C		R_T/R_o	R_T	mv	mv	mv	mv	mv	Reg.	mv	mv	mv	mv	mv
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
	19.346	-253.804	5.169027	2.287164	221.558	50.958	9.703		0.316	60.977	221.067	50.845	9.680		0.307	60.832
	20.150	-253	4.962780	2.230391	216.058	49.693	9.696			59.705	215.592	49.586	9.673			59.566
	23.156	-249.994	4.318535	2.053047	198.879	45.742	9.668			55.726	198.484	45.651	9.646			55.604
LNe	27.070	-246.080	3.694127	1.884148	182.517	41.979	9.627			51.922	182.184	41.902	9.604			51.813
LNe	27.139	-246.011	3.684734	1.881722	182.282	41.925	9.626	51.551	+0.316	51.867	181.951	41.849	9.603	51.452	+0.307	51.759
	31.360	-241.790	3.188776	1.753629	169.874	39.071	9.575		0.301	48.947	169.586	39.005	9.553		0.291	48.849
	38.882	-234.268	2.571884	1.592913	154.305	35.490	9.476		0.277	45.243	154.068	35.436	9.455		0.268	45.159
	48.076	-225.074	2.080039	1.464358	141.852	32.626	9.323		0.247	42.196	141.651	32.560	9.304		0.238	42.102
	63.806	-209.344	1.567250	1.324776	128.333	29.516	8.998		0.195	38.709	128.169	29.479	8.982		0.187	38.648
LN_2	77.474	-195.676	1.290751	1.246116	120.711	27.763	8.660		0.153	36.576	120.565	27.530	8.645		+0.147	36.322
LN_2	77.418	-195.732	1.291689	1.246383	120.737	27.769	8.662	36.431	+0.153	36.584	120.591	27.736	8.647	36.383	+0.147	36.530
	83.150	-190	1.202645	1.221196	118.297	27.208	8.505		0.147	35.860	118.158	27.176	8.491		0.140	35.807
	88.561	-184.589	1.129165	1.200413	116.284	26.745	8.350		1.141	35.236	116.149	26.714	8.336		0.134	35.184
	93.390	-179.760	1.070778	1.177214	114.037	26.228	8.206		0.136	34.570	113.907	26.199	8.192		0.130	34.521
CO_2	195.454	-77.696	0.511629	1.035664	99.356	22.852	4.156		0.029	27.037	99.258	22.829	4.150		+0.024	27.003
CO_2	194.534	-78.616	0.514060	1.035968	99.386	22.859	4.199	27.058	+0.029	27.087	99.278	22.834	4.192	27.026	+0.024	27.050
ICE	—	0	—	1.000000	96.870	22.280	0		0	22.280	96.776	22.258	0		-0.005	22.253
ICE	—	0	—	1.000000	96.870	22.280	0	22.280	0	22.280	96.776	22.258	0	22.258	-0.005	22.253
	338.193	60.043	0.300126	1.002629	97.125	22.339	-3.612		0.002	18.729	97.031	22.317	-3.614		+0.003	18.706
	—	60.442	—	1.002646	97.126	22.339	-3.637	18.702	+0.002	18.704	97.032	22.317	-3.639	18.678	+0.003	18.681
	—	60	—	1.002627	99.124	22.339	-3.609		↓	18.730	97.129	22.317	-3.611		↓	18.709

Calculated Full Range Transducer Calibration Data

Calculated M. & Range Transducer Calibration Data

Calculated 0 Range Transducer Calibration Data

22.280008

$(6) = \widetilde{I_c}\, R_o\, (R_T/R_o)$

CALIBRATION DATA SHEET
SN 22

H.C. Chandler
7 April 1966

	Temp.		Inverse Temp. 100/K or 180/R	No LOAD Element R_o = 98.7696			TC	Transducer Output	Correction	Corrected Transducer Output	100 K LOAD Element		TC	Transducer Output	Correction	Corrected Transducer Output	
	K	C		R_T/R_o	R_T	mv	mv	mv	mv	mv	Reg.	mv	mv	mv	mv	mv	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	
	19.295	-253.855	5.182680	2.339274	231.050	53.141	9.704		-0.020	62.825	230.518	53.019	9.681		-0.035	62.665	
	20.150	-253.	4.962780	2.275286	224.730	51.688	9.696			61.364	224.225	51.572	9.673			61.210	Calculated Full Range
	20.871	-252.279	4.791338	2.225398	219.803	51.204	9.690			60.874	219.320	50.444	9.667			60.076	
	23.290	-249.860	4.293631	2.087404	206.222	47.431	9.667			57.078	205.798	47.334	9.645			59.944	
	26.471	-246.679	3.777661	1.943389	191.949	44.178	9.633			53.791	191.581	44.064	9.610			53.639	
LN_2	27.139	-246.011	3.683734	1.918040	189.445	43.572	9.626	53.198	-0.020	53.178	189.088	43.490	9.603	53.093	-0.035	53.058	Transducer Calibration Data
	30.956	-242.194	3.230440	1.795708	177.362	40.793	9.580		-0.015	50.358	177.049	40.721	9.558		-0.029	50.250	
	37.784	-235.366	2.649111	1.639707	161.954	37.249	9.491		-0.006	46.734	161.692	37.189	9.470		-0.018	46.641	
	42.124	-231.026	2.373930	1.565603	154.635	35.566	9.438		⟲	45.004	154.396	35.511	9.417		-0.013	44.915	
LN_2	77.514	-195.631	1.290001	1.260542	124.504	28.636	8.659		0.049	37.344	124.389	28.609	8.644		+0.043	37.296	
LN_2	77.426	-195.724	1.291556	1.260980	124.547	28.646	8.662	37.303	+0.049	37.352	124.392	28.610	8.647	37.257	+0.043	37.300	Transducer Calibration Data
⊕	83.150	-190	1.202645	1.235927	122.703	28.222	8.505		+0.044	36.771	122.552	28.167	8.491		+0.038	36.716	Calculated Mid Range
CO_2	194.689	-78.461	0.513639	1.030223	101.755	23.404	4.192		-0.042	27.554	101.651	23.380	4.185		-0.048	27.517	
CO_2	194.532	-78.618	0.514060	1.030248	101.758	23.404	4.199	27.603	-0.042	27.561	101.654	23.380	4.192	27.572	-0.048	27.524	Transducer Calibration Data
ice	—	⟲	—	1.00000	98.770	22.717	⟲		⟲	27.717	98.672	22.695	⟲		-0.006	22.689	
ice	—	⟲	—	1.00000	98.770	22.717	⟲	22.717	⟲	22.717	98.672	22.695	⟲	22.695	-0.006	22.689	Transducer Calibration Data
AMB	295.440	22.290	0.338179	0.998986	98.670	22.694	-1.298		-0.008	21.388	98.572	22.672	-1.297		0.004	21.379	
	—	60.457	—	1.001528	98.921	22.752	-3.638	19.114	+0.020	19.134	98.823	22.729	-3.640	19.089	+0.022	19.111	Transducer Calibration Data
	331.390	58.240	0.301759	1.001380	98.906	22.748	-3.498		↓	19.270	98.808	22.726	-3.500		0.020	19.246	
	—	60	—	1.001499	98.918	22.751	-3.609			19.162	98.820	22.729	-3.611		0.021	19.139	Calculated 0 Range

$$(6) = \widetilde{22.7170}\, I_c R_o (R_T/R_o)$$

CALIBRATION DATA SHEET
SN 23

H.C. Chandler
11 April 1966

	Temp.		Inverse Temp. 100/K or 100/C+273.16	NO LOAD Element R_o = 98.5435			TC	Transducer Output	Correctn	Corrected Transducer Output	100K LOAD Element		TC	Transducer Output	Correctn	Corrected Transducer Output	
	K	C		R_T/R_o	R_T	mv	mv	mv	mv	mv	Reg	mv	mv	mv	mv	mv	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	
	19.295	-253.855	5.182680	2.345606	231.115	53.163	9.704		-0.728	62.139	230,582	53,034	9.681		-0.739	61,976	
	20.150	-253	4.962780	2.280097	224.689	51.678	9.696			60.646	224.185	51.563	9.673			60.497	Calculated Full Range
	20.871	-252.279	4.791338	2.229024	219.655	50.521	9.690			59.483	219.173	50.410	9.667			59.338	
	23.290	-249.860	4.293631	2.091057	206.059	47.394	9.667			56.333	205.635	47.296	9.645			56.202	
	26.471	-246.679	3.777661	1.946252	191.790	44.112	9.633			53.017	191.422	44.027	9.610			52.898	
LN_2	27.134	-246.016	3.685413	1.921205	189.322	43.544	9.626	53.170	-0.728	52.442	188.965	43.462	9.603	53.065	-0.739	52.326	Transducer Calibration Data
	30.956	-242.194	3.230440	1.797625	177.150	40.744	9.580		-0.710	49.614	176.837	40.673	9.558		-0.730	49.501	
	37.784	-235.366	2.649111	1.641638	161.773	37.208	9.491		-0.672	46.027	161.511	37.148	9.470		-0.693	45.925	
	42.124	-231.676	2.373930	1.567412	154.458	35.525	9.438		-0.668	44.295	154.220	35.471	9.417		-0.676	44.212	
LN_2	77.519	-195.631	1.290001	1.260768	124.241	28.575	8.659		-0.514	36.720	124.087	28,540	8.644		-0.524	36,660	
LN_2	77.426	-195.724	1.291556	1.261208	124.284	28.585	8.662	37.247	-0.514	36.733	124.130	28.550	8.647	37.197	-0.524	36.673	Transducer Calibration Data
	83.150	-190	1.202645	1.262900	123.465	28374	8.505		-0.507	36,372	123.313	28.362	8.491		-0.516	36.337	Calculated Mid Range
CO_2	194.689	-78.461	0.513639	1.030323	101.531	23.352	4.192		-0.367	27.177	101.428	23.328	4.185		-0.370	27.143	
CO_2	194.785	-78.365	0.513400	1.030286	101.528	23.351	4.188	27.539	-0.367	27.172	101.425	23.328	4.181	27.509	-0.370	27.139	Transducer Calibration Data
ICE	—	⟲	—	1.000000	98.544	22.665	⟲		⟲	22.665	98.447	22.643	⟲		-0.008	22.635	
ICE	—	⟲	—	1.000000	98.544	22.665	—	22.665	⟲	22.665	98.447	22.643	⟲	22.643	-0.008	22.635	Transducer Calibration Data
AMB	295.440	22.290	0.338479	0.979952	96.568	22.211	-1.298		-0.139	20.774	96.474	22.189	-1.297		-0.145	20.747	
	—	56.301	—	1.006051	98.548	22.666	-3.377	19.269	-0.351	18.938	98.451	22.644	-3.378	19.266	-0.355	18.911	Transducer Calibration Data
	331.390	58.240	0.301759	1.001197	98.662	22.692	-3.498			18.843	98.564	22.670	-3.500			18.815	
	—	60	—	1.002237	98.764	22.716	-3.609		↓	18.756	98.666	22.693	-3.611		↓	18.727	Calculated 0 Range

22.6650

$(4) = I_c R_o (R_T/R_o)$

CALIBRATION DATA SHEET
SN 24

H. C. Chambers

11 April 1966

Temp,		Inverse Temp, 100/K or 100/C	No LOAD							100 K LOAD					
			Element R_o = 97.9696 Ω			TC	Transducer Output	Correction	Corrected Transducer Output	Element		TC	Transducer Output	Correction	Corrected Transducer Output
K	C		R_T/R_o	R_T	mv	mv	mv	mv	mv	Reg	mv	mv	mv	mv	mv
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
19.295	-253.855	5.182680	2.333084	228.572	52.571	9.704		-0.220	62.055	228.050	52.452	9.681		-0.227	61.906
20.150	-253	4.962705	2.268960	222.290	51.126	9.696			60.662	221.798	51.014	9.673			60.460
20.871	-252.279	4.791338	2.218966	217.392	50.000	9.690			59.470	216.921	49.892	9.667			59.332
23.290	-249.860	4.293631	2.080788	203.855	46.886	9.667			56.333	203.440	46.791	9.645			56.209
26.471	-246.679	3.777461	1.937694	189.836	43.662	9.633			53.075	189.476	43.579	9.610			52.962
LN2 27.135	-246.015	3.685277	1.912884	187.403	43.103	9.626	52.729	-0.220	52.509	187.153	43.022	9.603	52.625	-0.227	52.393
30.956	-242.194	3.230440	1.790616	175.427	40.348	9.580		-0.214	49.714	175.120	40.278	9.558		-0.220	49.616
32.784	-240.366	2.649111	1.636183	160.297	36.868	9.491		-0.202	46.157	160.041	36.809	9.470		-0.208	46.071
42.120	-231.676	2.373930	1.562623	153.090	35.211	9.438		-0.196	44.453	152.856	35.157	9.417		-0.202	44.372
LN2 77.519	-195.631	1.290001	1.258227	123.268	28.352	8.659		-0.137	36.874	123.117	28.317	8.644		-0.142	36.819
LN 77.407	-195.733	1.291488	1.258701	123.315	28.362	8.662	37.024	-0.137	36.887	123.164	28.325	8.647	36.975	-0.142	36.833
83.150	-190	1.202645	1.233696	120.865	27.799	8.525		-0.138	36.166	120.719	27.765	8.491		-0.143	36.113
CO_2 194.689	-78.461	0.513639	1.029259	100.837	23.192	4.192		-0.151	27.233	100.735	23.169	4.185		-0.152	27.202
CO_2 194.531	-78.619	0.514060	1.029316	100.842	23.194	4.199	27.373	-0.151	27.242	100.740	23.170	4.192	27.362	-0.152	27.220
ICE —	⊖	—	1.000000	97.970	22.533	⊖		⊖	22.533	97.874	22.511	⊖		-0.004	22.507
ICE —	⊖	—	1.000000	97.970	22.533	⊖	22.533	⊖	22.533	97.874	22.511	⊖	22.511	-0.004	22.507
AMB 295.440	22.290	0.338479	0.998494	97.822	22.499	-1.298		+0.023	21.224	97.726	22.477	-1.297		+0.020	21.200
—	57.063	—	1.000528	98.023	22.545	-3.425	19.120	+0.060	19.180	97.927	22.523	-3.426	19.097	+0.055	19.152
331.390	58.240	0.301759	1.000607	98.029	22.547	-3.498			19.109	97.933	22.525	-3.500			19.080
—	60	—	1.000710	98.040	22.549	-3.609			19.000	97.944	22.527	-3.611			18.971

Calculated Fuel Range

Transducer Calibration Data

Transducer Calibration Data

Calculated Fuel Range

Transducer Calibration Data

Transducer Calibration Data

Transducer Calibration Data

Calculated O Range

$$(6) = \overbrace{I_c R_o}^{22.533008} \left(R_T/R_o\right)$$

CALIBRATION DATA SHEET SN 25

H.C. Chanlon

12 April 1966

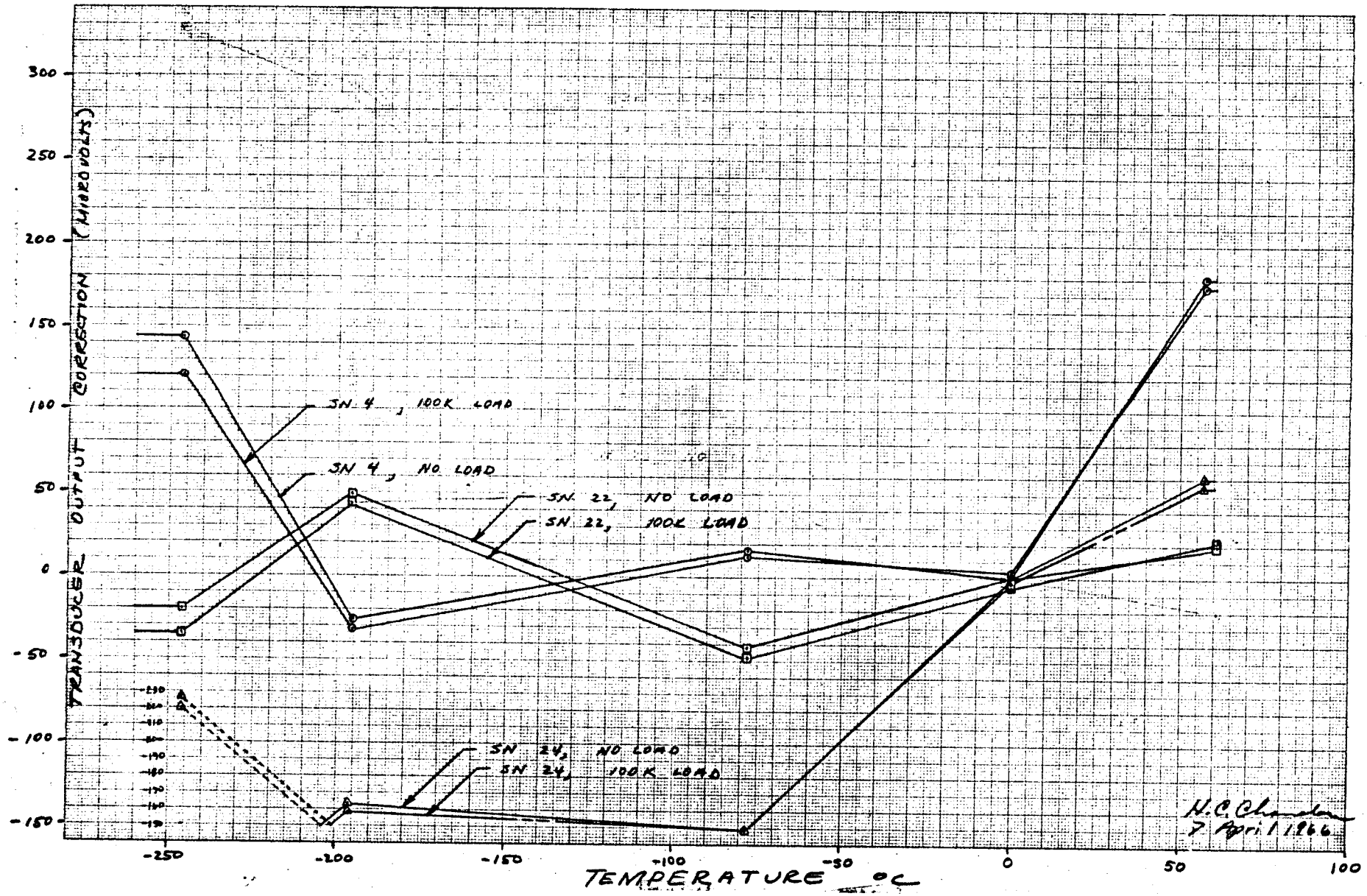
	Temp.		Inverse Temp. 100/K or 100/	NO LOAD Element R_o = 99.1261			TC	Transducer Output	Correction	Corrected Transducer Output	100K LOAD Element		TC	Transducer Output	Correction	Corrected Transducer Output	
	K	C		R_T/R_o	R_T	mv	mv	mv	mv	mv	Reg	mv	mv	mv	mv	mv	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	
	19.295	-253.855	5.182680	2.309186	228.901	52.647	9.704		-0.730	61.621	228.378	52.527	9.681		-0.736	61.472	
	20.150	-253	4.962780	2.248444	222.879	51.262	9.696			60.228	222.383	51.148	9.673			60.685	Calculated Full Range
	20.871	-252.279	4.791338	2.201088	218.185	50.183	9.690			59.143	217.710	50.073	9.667			59.004	
	23.290	-249.860	4.293631	2.072481	205.437	47.250	9.667			56.187	205.017	47.154	9.645			56.063	
	26.471	-246.679	3.777661	1.923078	190.627	43.844	9.633			52.747	190.264	43.761	9.610			52.635	
LN_2	27.139	-246.011	3.683734	1.898351	187.175	43.053	9.626	52.679	-0.730	51.949	186.836	42.972	9.603	52.575	-0.736	51.837	Transducer Calibration Data
	50.956	-242.194	3.230440	1.779016	176.347	40.560	9.580		-0.726	49.414	176.037	40.489	9.558		-0.732	49.315	
	37.784	-235.366	2.649111	1.627166	161.295	37.098	9.491		-0.719	45.870	161.036	37.038	9.470		-0.726	45.782	
	42.124	-231.676	2.373930	1.555278	154.169	35.459	9.438		-0.717	44.180	153.932	35.404	9.417		-0.723	44.098	
LN_2	77.519	-195.631	1.290001	1.256349	124.537	28.644	8.659		-0.687	36.616	124.382	28.608	8.644		-0.695	36.557	
LN_2	77.471	-195.679	1.290806	1.256571	124.559	28.649	8.660	37.309	-0.687	36.622	124.403	28.613	8.645	37.275	-0.695	36.563	Transducer Calibration Data
	83.150	-190	1.202645	1.232258	122.149	28.094	8.505		-0.678	35.921	122.000	28.060	8.491		-0.685	35.866	Calculated Mid Range
CO_2	194.689	-78.461	0.513639	1.028991	102.000	23.460	4.192		-0.504	27.148	101.896	23.436	4.185		-0.508	27.113	
CO_2	194.532	-78.618	0.514060	1.029049	102.006	23.461	4.199	27.660	-0.504	27.156	101.902	23.437	4.172	27.621	-0.508	27.121	Transducer Calibration Data
ICE	—	〃	—	1.000000	99.126	22.799	〃		〃	22.799	99.028	22.776	〃		-0.017	22.759	
ICE	—	〃	—	1.000000	99.126	22.799	〃	22.799	〃	22.799	99.028	22.776	〃	22.776	-0.017	22.759	Transducer Calibration Data
Amb	295.440	22.290	0.338477	0.999461	99.073	22.787	-1.298		-0.158	21.331	98.975	22.764	-1.297		-0.170	21.297	
	—	56.933	—	1.000789	99.204	22.817	-3.417	19.400	-0.404	18.996	99.106	22.791	-3.415	19.378	-0.407	18.971	Transducer Calibration Data
	331.490	58.340	0.301668	1.000843	99.209	22.818	-3.567			18.847	99.111	22.796	-3.569			18.820	
	—	60	—	1.013917	100.506	23.116	-3.609			19.103	100.405	23.093	-3.611			19.075	Calculated 0 Range

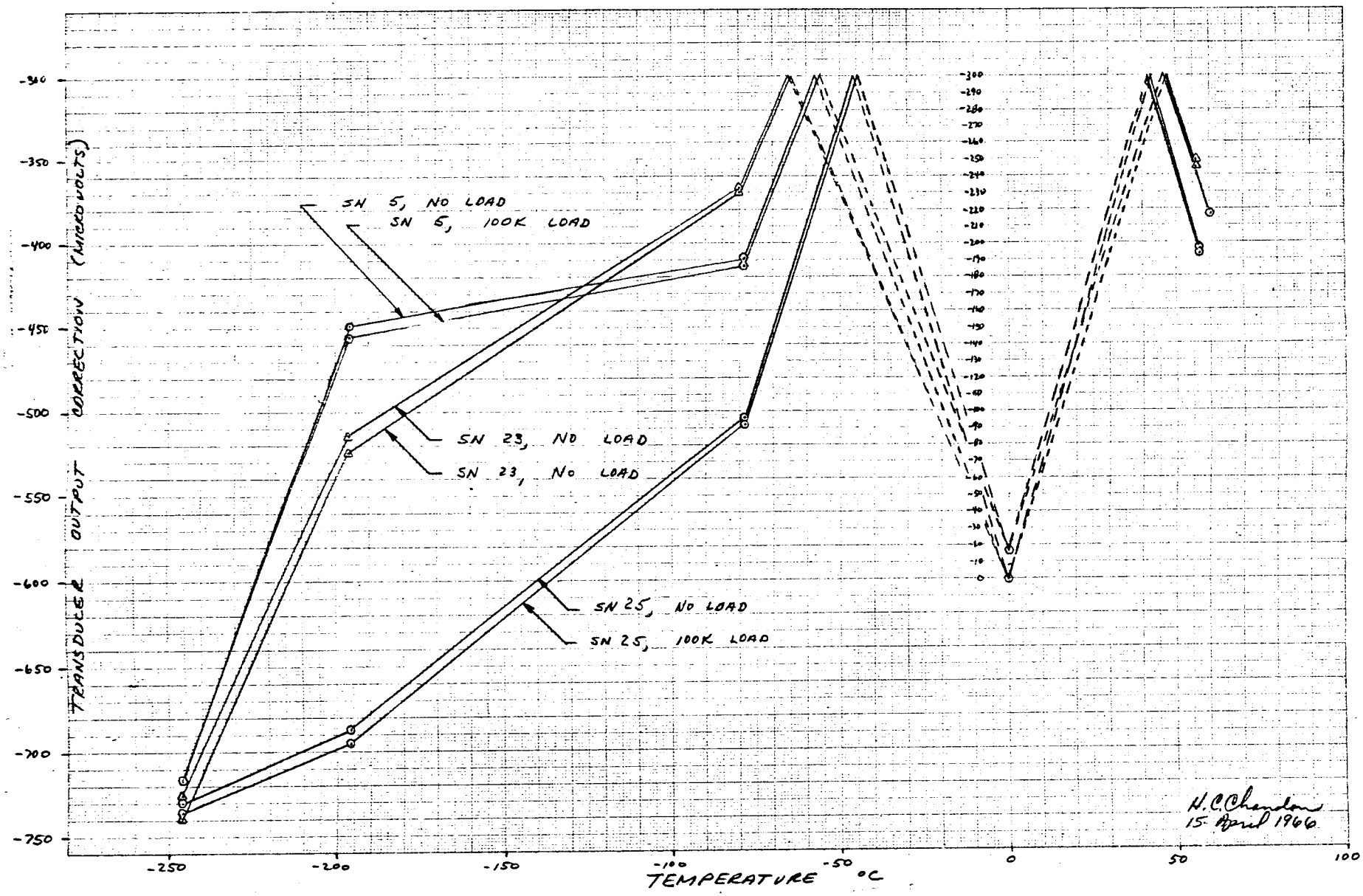
$$(6) = \overbrace{I_c R_o}^{22.799003} (R_T/R_o)$$

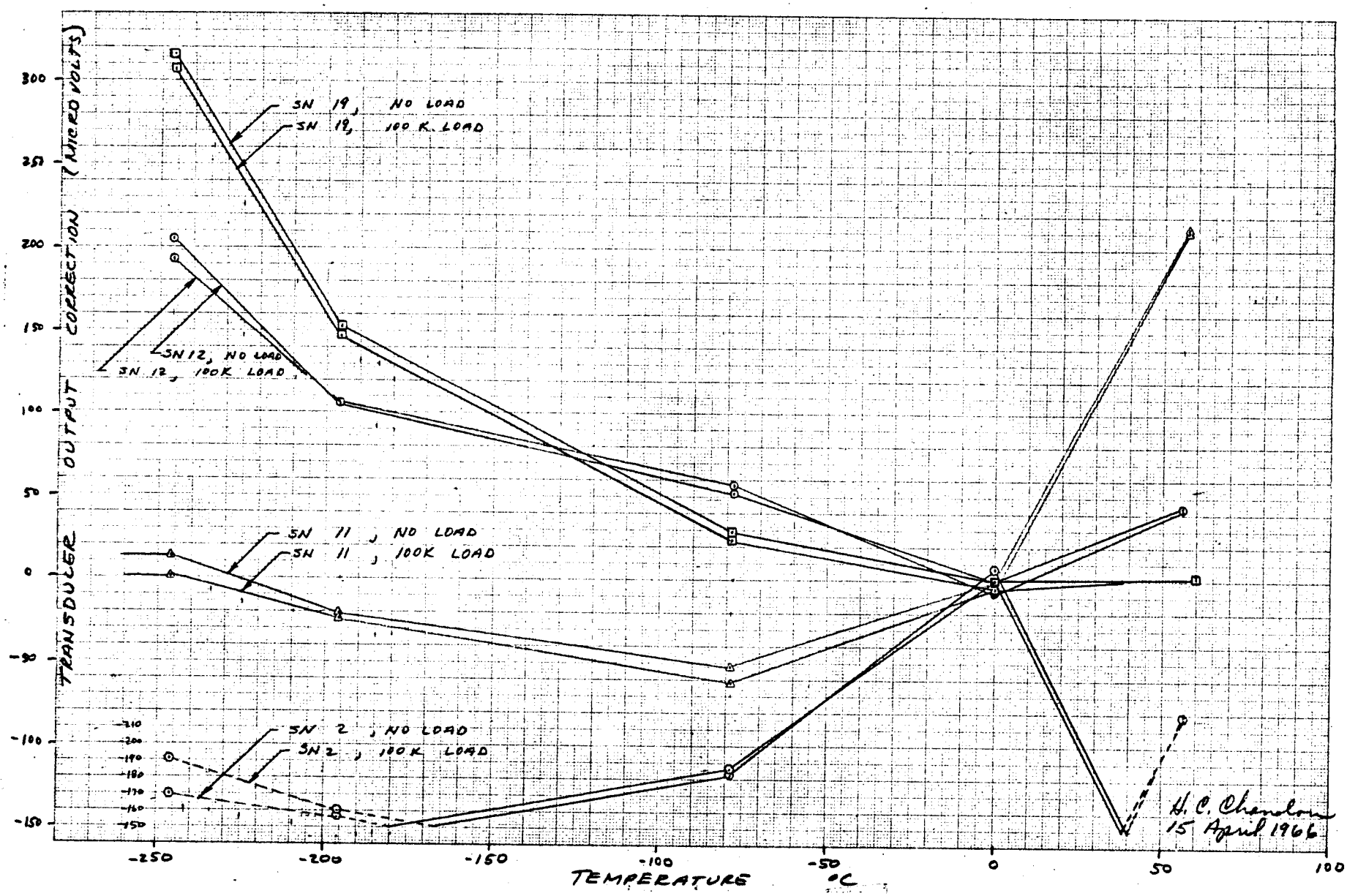
Enclosure 10
0700:1161

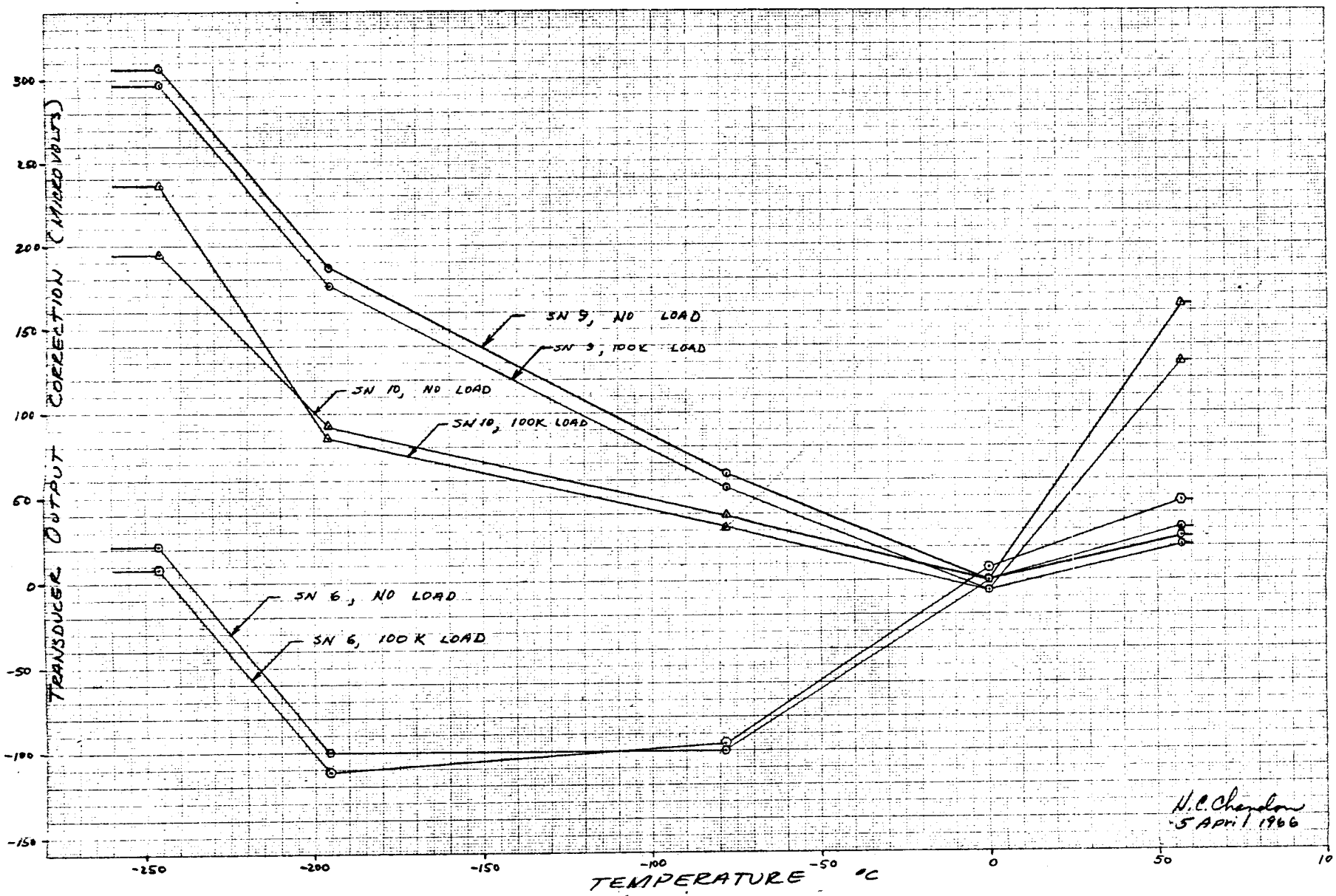
TRANSDUCER OUTPUT CORRECTION

CURVES FOR 13 PRODUCTION TRANSDUCERS


TRANSDUCER OUTPUT CORRECTION (MICROVOLTS)
300
250
200
150
100
50
0
-50
-100
-150
SN 4, 100K LOAD
SN 4, NO LOAD
SN 22, NO LOAD
SN 22, 100K LOAD
SN 24, NO LOAD
SN 24, 100K LOAD
-250
-200
-150
-100
-50
0
50
100
TEMPERATURE °C
N.C. Chandler
7 April 1966


TRANSDUCER OUTPUT CORRECTION (MICROVOLTS)
-300
-350
-400
-450
-500
-550
-600
-650
-700
-750
SN 5, NO LOAD
SN 5, 100K LOAD
SN 23, NO LOAD
SN 23, NO LOAD
SN 25, NO LOAD
SN 25, 100K LOAD
-250
-200
-150
-100
-50
0
50
100
TEMPERATURE °C
H.C. Chandler
15 April 1966


TRANSDUCER OUTPUT CORRECTION (MICRO VOLTS)
300
250
200
150
100
50
0
-50
-100
-150
SN 19, NO LOAD
SN 19, 100 K. LOAD
SN 12, NO LOAD
SN 12, 100K LOAD
SN 11, NO LOAD
SN 11, 100K LOAD
SN 2, NO LOAD
SN 2, 100K LOAD
-210
-200
-190
-180
-170
-160
-150
-250
-200
-150
-100
-50
0
50
100
TEMPERATURE °C
H. C. Chamberlain
15 April 1966


TRANSDUCER OUTPUT CORRECTION (MICROVOLTS)
300
250
200
150
100
50
0
-50
-100
-150
SN 9, NO LOAD
SN 9, 100K LOAD
SN 10, NO LOAD
SN 10, 100K LOAD
SN 6, NO LOAD
SN 6, 100 K LOAD
-250
-200
-150
-100
-50
0
50
100
TEMPERATURE °C
N.C. Chandler
5 April 1966

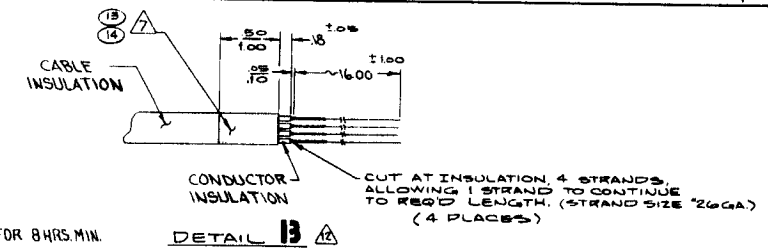
Enclosure 11
0700:1161

FABRICATION DRAWINGS

FOR MODEL RJ-100 THERMOCOUPLE REFERENCE JUNCTION

NOTES:

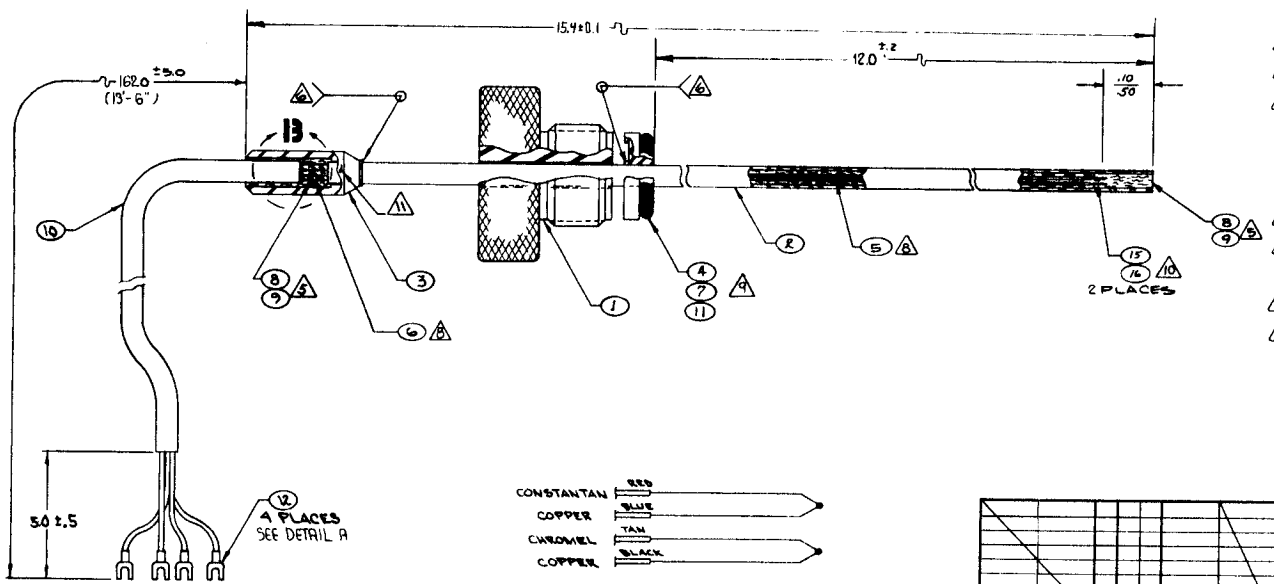
1. REMOVE ALL BURRS & SHARP EDGES.
2. INTERPRET DWG PER STDS. PRESCRIBED IN MIL-D-70327.
3. CLEAN TO LEVEL 'H' PER AGC-46350.
4. PRESERVE & PACKAGE PER AGC-46387, CLASS I.
5. EPOXY SHALL BE 50%-50% MIXTURE BY VOLUME CURED AT 125 ±15° F FOR 8 HRS. MIN.
6. TIG WELD PER AGC-46351.
7. CONDUCTOR & CABLE TO BE EPOXY BOND TREATED. APPLY PER MFG. INSTRUCTIONS.
8. REF. JUNCTION LEADS SHALL BE INSULATED TO PREVENT SHORTING TOGETHER OR TO SHEATH & HOUSING
9. COAT "O" RING SEAT WITH THIN LAYER OF ADHESIVE TO RETAIN THE "O" RING
10. TWIST WIRES PER SCHEMATIC TO FORM MECHANICAL BOND & SOLDER
11. MARK PER ASD 5215 C WITH : AEROMETRICS
    MODEL RJ-100A
    AEROMETRICS ASG. SN.
12. DURING CABLE PREPARATION & ASSEMBLY, HANDLE WITH CLEAN HANDS & AVOID EXCESSIVE BENDING OF WIRES
13. ACCEPTANCE TESTS SHALL BE PERFORMED ON EACH UNIT MANUFACTURED



DETAIL B

REVISIONS				
REV	ZONE	DESCRIPTION	DATE	APPROVED
		REVISED TO REFLECT AS BUILT CONDITION	3-1-66 CPR	3-1-66

DETAIL A



SCHEMATIC

ITEM NO.	ZONE	SPECIFICATION	MATERIAL	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	CODE IDENT NO.	DWG	QTY	UNIT WT
16			HANDY HARMON NEW YORK, N.Y.	TEC	FLUX			AR	A
15			SN63 .032 DIA. ROSIN SOLDERETTE CODE QQ-S-571C-2 SANTA ANA, CALIF.	V-5M00T	SOLDER			AR	A
14				L-2500	POLYMER COAT	09794		AR	A
13				L-2501	ADBOND	09794		AR	A
12				53106	TEDAMAL	79061		4	
11			LOCTITE CORP. NEWINGTON, CONN	404	ADHESIVE-QUICK SET			AR	A
10					CABLE	97195		AR	
9			EPOXY	140	VERSAMIDE	24608		AR	A
8			EPOXY	828	EPON	86761		AR	A
7				S-230	O-RING	83259		1	
6				NO. 24 SERIES B	REFRACIL TUBING	83424		AR	A
5			ALPHA WIRE CO.	NO. 22 TYPE 422A	TUBING, PLASTIC			AR	A
4			.750 RD BAR CRES TYPE 321 or 304	-7	STOP			1	
3			.375 RD. ROD CRES TYPE 321 or 304	-5	HOUSING, TRANSITION			1	
2			.187 TUBING .010 WALL THK CRES TYPE 321 or 304	-3	SHEATH, STEM			1	
1			2.00 DIA ROD NYLON	-1	NUT, KNURLED			1	
		MATERIAL		NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	CODE IDENT NO.	DWG	QTY	UNIT WT

LIST OF MATERIALS

1125498 SHT 1 OF 2

USAGE DATA									
ON	THRU	-9	1	1	FINAL				
EFFECTIVE SERIAL NO.		PART NO.	NEXT HIGHER ASSY	NEXT ASSY	USED ON APPLICATION				
		QTY REQD PER ASSY							
		DRAWING LEVEL			1				

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
DECIMAL TOLERANCE .XX ± .04, .XXX ± .005
ANGULAR TOLERANCE ± 2°
DO NOT SCALE DRAWING

TREATMENT
FINISH: POLISHED
SIMILAR TO
WEIGHT: CALC. ACT.

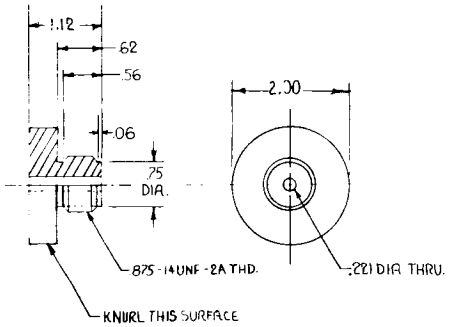
DRAWN	T. CAMPBELL	10/7/65
STRESS		
DESIGN	T. CAMPBELL	10/29/65
REVISIONS		11/17/65
STRESS VERIFY		
REVISIONS (NOT RELEASED)		
DESIGN ACTIVITY APPD		11/30/65
CUSTOMER		

AEROJET-GENERAL CORPORATION SACRAMENTO, CALIFORNIA

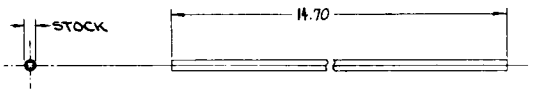
TITLE: REFERENCE JUNCTION, THERMOCOUPLE MODEL RJ-100

CODE IDENT. NO.	DWG NO.	REV
05824	1125498	D

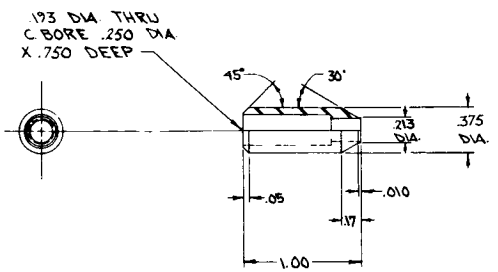
SCALE NONE | RELEASE DATE 5-5-66 | SHEET 1 OF 2



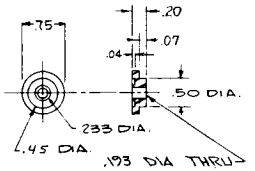
-1 DETAIL
SCALE 1/1



-3 DETAIL
SCALE 1/1



-5 DETAIL



-7 DETAIL
SCALE 1/1

NOTE:
ALL PARTS SHALL HAVE A 32 OR BETTER.

(13) ACCEPTANCE TEST PROCEDURE

STEP 1. THE RESISTANCE BETWEEN THE TERMINALS ON THE WIRES SHALL NOT EXCEED THE VALUES SPECIFIED BELOW (MEASURED AT AMBIENT TEMPERATURE 72 ± 5 °F.)

RED TO BLUE - 6 OHMS
TAN TO BLACK - 9 OHMS

STEP 2. THE INSULATION RESISTANCE BETWEEN EACH PAIR OF WIRES (RED-BLUE AND TAN-BLACK) SHALL BE GREATER THAN 10 MEGOHMS WHEN MEASURED WITH 50 VDC AT AMBIENT TEMPERATURE 72 ± 5°F.

REVISIONS				
ZONE		DESCRIPTION	DATE	APPROVED
		REVISED TO REFLECT AS BUILT CONDITION	5-11-66 CPR	5-2-66

QTY REQD	SYM	CODE IDENT NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT	ZONE	ITEM NO.

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
DECIMAL TOLERANCE XX ± .25, XXX ± .005
ANGULAR TOLERANCE ± 2°
DO NOT SCALE DRAWING

TREATMENT
FINISH
SIMILAR TO
WEIGHT CALC NET
DESIGN ACTIVITY APPD
CUSTOMER

AEROJET-GENERAL CORPORATION
SACRAMENTO, CALIFORNIA

TITLE REFERENCE JUNCTION, THERMOCOUPLE MODEL RJ-100

CODE IDENT NO. 05824 | DWG SIZE D | DWG NO. 1125498
SCALE | RELEASE DATE 5-2-66 | SHEET 2 OF 2

1125498
COPY